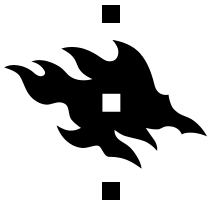


UNIVERSITY OF HELSINKI

The importance of sustainability in online-based communication in Finnish wood products industry

Master's Thesis
for the examination of Master of Science (Agr. & For.)
Forest Products Marketing and Management

Anastasia Korhonen

April, 2015

Prologue

First of all, I want to thank Prof. Anne Toppinen for giving me an incomparable opportunity to be part of International research project ‘W3B: Societal perceptions of forest sector on sustainability’ that gave me a basis to my thesis work. I am also very grateful to Anne for her guidance, patience and support during this study process. In addition, I greatly appreciate the collaboration and productive discussion with my colleagues from Austria, Germany and Slovenia regarding the project. Due to the funding the study was carried out smoothly and so I want to express my gratitude for W3B project, Martti Levón’s scholarship fund and Metsämiesten Säätiö Foundation for financial support.

Last but not least the warmest thanks go to my family and friends, who have always been by my side and encouraged me in my studies.

Helsinki, 1.4.2015

Anastasia Korhonen

ABSTRACT

HELSINGIN YLIOPISTO — HELSINGFORS UNIVERSITET — UNIVERSITY OF HELSINKI

Tiedekunta/Osasto — Fakultet/Sektion — Faculty	Laitos — Institution — Department
Faculty of Agriculture and Forestry	Department of Forest Sciences

Tekijä — Författare — Author

Korhonen, Anastasia Elina

Työn nimi — Arbetets titel — Title

The importance of sustainability in online-based communication in Finnish wood products industry

Oppiaine —Läroämne — Subject

Forest Products Marketing and Management

Työn laji — Arbetets art — Level	Aika — Datum — Month and year	Sivumäärä — Sidoantal — Number of pages
Master's Thesis	April 2015	99 p. + appendix

Tiivistelmä — Referat — Abstract

The wood products industry has a significant impact on the natural environment and surrounding society by utilizing natural resources in its operations. After receiving criticism from stakeholders, forest companies have increasingly paid attention to economic and social features together with environmental performance.

When covering sustainability communication in forest products industry, previous studies have mainly been focusing on sustainability reporting. After spread of digitalization the importance of sustainability-related online communication has increased, especially among forest companies and associations. This study addresses the sustainability-related online communication in the wood products industry, since it has not been studied extensively yet.

The purpose of the study is to examine on corporate and sectoral levels how companies and associations communicate with their stakeholders online and what are the current topics of sustainability-related online communication in the forest products industry in Finland. Empirical data was collected by carrying out the qualitative content analysis inductively and deductively based on forest companies' and associations' websites. Both methods were utilized to ensure discover of topical sustainability issues from data.

According to the findings, sustainability communication of forest companies and associations still bases on environmental factors. However, the share of social factors such as stakeholder engagement is growing. Although, majority of forest companies and associations have applied various social media channels to communicate with their stakeholders, the evaluation of the communication effectiveness of these channels is difficult and requires further research. In the end, to achieve mutual benefit companies need to engage and involve their stakeholders in decision-making process on company's sustainability issues through social media or other online platforms.

Avainsanat — Nyckelord — Keywords

Sustainability, corporate responsibility, corporate social responsibility, online-communication, stakeholder engagement, forest products industry, Finland

Säilytyspaikka — Förvaringsställe — Where deposited

E-thesis

Muita tietoja — Övriga uppgifter — Further information

TIIVISTELMÄ

HELSINGIN YLIOPISTO — HELSINGFORS UNIVERSITET — UNIVERSITY OF HELSINKI

Tiedekunta/Osasto — Fakultet/Sektion — Faculty	Laitos — Institution — Department	
Maatalous-metsätieteellinen tiedekunta	Metsätieteiden laitos	
Tekijä — Författare — Author		
Korhonen, Anastasia Elina		
Työn nimi — Arbetets titel — Title		
Kestävyysviestinnän tärkeys Suomen puutuoteteollisuuden verkkoviestinnässä		
Oppiaine —Läroämne — Subject		
Metsäteollisuuden markkinointi ja johtaminen		
Työn laji — Arbetets art — Level	Aika — Datum — Month and year	Sivumäärä — Sidoantal — Number of pages
Pro-gradu tutkielma	Huhtikuu 2015	99 s. + liitteet

Tiivistelmä — Referat — Abstract

Puutuoteteollisuudella on merkittävä vaikutus luontoon sekä ympäröivään yhteiskuntaan sen hyödyntäessä luonnonvaroja toiminnassaan. Saatuaan kritiikkiä sidosryhmiltään, metsäyhtiöt ovat kiinnittäneet enemmän huomiota toiminnassaan taloudellisiin ja sosiaalisiin ominaisuuksiin ympäristöllisen suoristuskyvyn rinnalla.

Aiemmat tutkimukset ovat pääasiassa keskittyneet kestävän kehityksen raportointiin käsiteltäessä kestävyysviestintää puutuoteteollisuudessa. Digitalisaation yleistymisen jälkeen verkkopohjaisen kestävyysviestinnän tärkeys on kasvanut, erityisesti metsäyhtiöiden ja –järjestöjen keskuudessa. Tämän tutkimuksen tavoitteena on pureutua verkkopohjaiseen kestävyysviestintään puutuoteteollisuudessa, sillä aikaisemmat tutkimukset ovat tältä osin olleet vähäisiä.

Tutkimuksen tarkoituksena on tutkia yritys- ja sektoritasolla kuinka yritykset ja järjestöt kommunikoivat heidän sidosryhmiensä kanssa verkossa ja mitkä ovat verkkopohjaisen kestävyysviestinnän ajankohtaisimmat aiheet puutuoteteollisuudessa. Empiirinen aineisto kerättiin suorittamalla laadullinen sisällönanalyysi sekä induktiivisesti että deduktiivisesti metsäyritysten ja –järjestöjen verkkosivuihin pohjautuen. Hyödyntämällä molempia tutkimusmetodeja varmistetaan ajankohtaisten kestävyysteemojen havaitseminen aineistosta.

Tulosten mukaan metsäyhtiöiden ja –järjestöjen kestävyysviestintä perustuu edelleen ympäristöllisiin tekijöihin. Kuitenkin sosiaalisten tekijöiden kuten sidosryhmien osallistamisen osuus on kasvussa. Vaikka suurin osa metsäyhtiöistä ja –järjestöistä hyödyntää sosiaalisen median eri kanavia kommunikoidakseen sidosryhmiensä kanssa, on viestinnän tehokkuuden arviointi näissä vaikeaa ja vaatii lisätutkimuksia. Loppujen lopuksi, jotta yhteinen hyöty saavutettaisiin, yritysten tulee sitouttaa ja osallistaa sidosryhmiään päätöksentekoprosessiin yrityksen kestävyysasioista sosiaalisen median tai muiden verkkopohjaisten alustojen kautta.

Avainsanat — Nyckelord — Keywords	
Kestävyys, yhteiskuntavastuu, yritysvastuu, online-viestintä, sidosryhmäajattelu, puutuoteteollisuus, Suomi	
Säilytyspaikka — Förvaringsställe — Where deposited	
E-thesis	
Muita tietoja — Övriga uppgifter — Further information	

List of Abbreviations and Acronyms

AEO: Authorized economic operator

AOX: Adsorbable organic halogen compounds

CARB: California Air Resource Bourne

CE: Conformité Européenne

CO_2: Carbon dioxide

CoC: Chain of Custody certificate

COD: Chemical oxygen demand

CR: Corporate responsibility

CSR: Corporate social responsibility

CSV: Concept of shared value

DNV: Det Norske Veritas

EMAS: Eco-Management and Audit Scheme

EU: European Union

FSC: Forest Stewardship Council

GRI: Global Reporting Initiative

IFRS: International Financial Reporting Standards

ISO 14000: Environmental management

ISO 14001: Environmental management

ISO 22000: Food safety management

ISO 26000: Social responsibility

ISO 31000: Risk management

ISO 50001: Energy management

MC: Micro cellulose

MSO: Strategic Program for the Forest Sector

NGO: Non-governmental organization

NO_x: Nitrogen oxide

OECD: Organization for Economic Cooperation and Development

OHSAS 18001: Occupational health and safety

PE-CONS 47/14: CSR and Transparency Regulation for large European companies

PEFC: Programme for the Endorsement of Forest Certification schemes

R&D: Research and development

SO_2: Sulphur dioxide

TBL: Triple bottom line

UN: United Nations

UNGC: United Nations Global Compact

WBCSD: World Business Council for Sustainable Development

Table of contents

1. Background of the study

1.1. Significance of wood product industry in Finland

In 2012, deepening economic crisis in Europe impaired operating conditions of forest industry prominently and majority of indicators of the industry began to decline (Finnish Forest Research Institute 2013). Although, the economic recession continued in the European main markets in 2013, most of the indicators of forest industry yet revived. Production of sawn timber rose by 11% to 10.4 million cubic meters and directly affected sawn goods and plywood production (see Figure 1). In its entirety, profitability of the wood product industry improved to 4% of domestic turnover from the previous years in terms of operating margin and total profit. The main reasons for that were increases in export volumes of sawn goods and plywood as well as the positive price development of export. On the other hand, busy remained wood supply restrained increase in raw material cost. (Finnish Forest Research Institute 2014b).

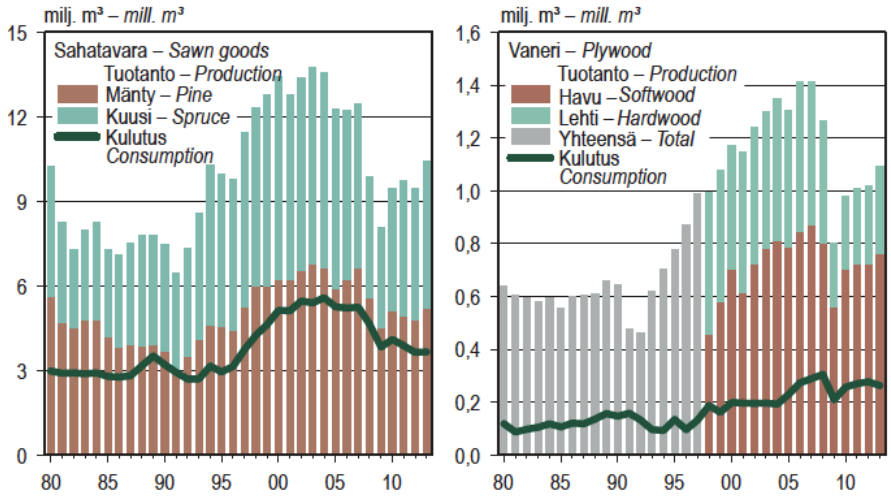


Figure 1. Production and domestic consumption of sawn goods and plywood 1980-2013, from Finnish Statistical Yearbook of Forestry 2014.

Despite of various uncertainties, the global economy is predicted to remain at last year's level in 2014. Albeit the growth in the key markets of forestry in the euro area is expected to pick up slightly in 2015, the growth remains still slow and the country-specific differences in euro area are remarkable. However, increase in production

volumes, export and export prices of sawn goods and plywood have enhance forest products industry's profitability in 2014. This can be explained by the fact that the high demand for sawn goods in Europe and North Africa achieved the rapid increase in Finnish sawn wood exports and production in first half of 2014. Albeit the outlook during early autumn have deteriorated especially in Europe, exports of sawn good are increasing and export prices are rising from the previous year for the whole year 2014. (Finnish Forest Research Institute 2014a).

Finnish sawmill industry produced around 8% of overall coniferous sawn good production in 2013 in Europe. Albeit, by the fact that around two thirds of the production is exported, as a single area Finland's domestic market is the most important. The consumption of sawn goods in Finland is around an abundant cubic meter per person in each year. Elsewhere in Europe, the usage is only less than 0.2 cubic meters per capita. (Hetemäki et al. 2009, FAOSTAT Forestry 2014).

According to Lähtinen (2009), company reputation and services, raw material, collaboration and technological know-how together generate the company-level competitive advantage of large- and medium- sized Finnish sawmills. In contrast, the competitiveness of the Finnish sawmill industry has decreased in past years, since it has lost its market position especially for Germany, Sweden and the Eastern European countries such as Russia. The objectives of the ongoing government project, Strategic Program for the Forest Sector (MSO), are strengthening of economic growth, competitiveness and employment in Finland as well as increasing the share of wood in construction. (Strategic Program for the Forest Sector 2012).

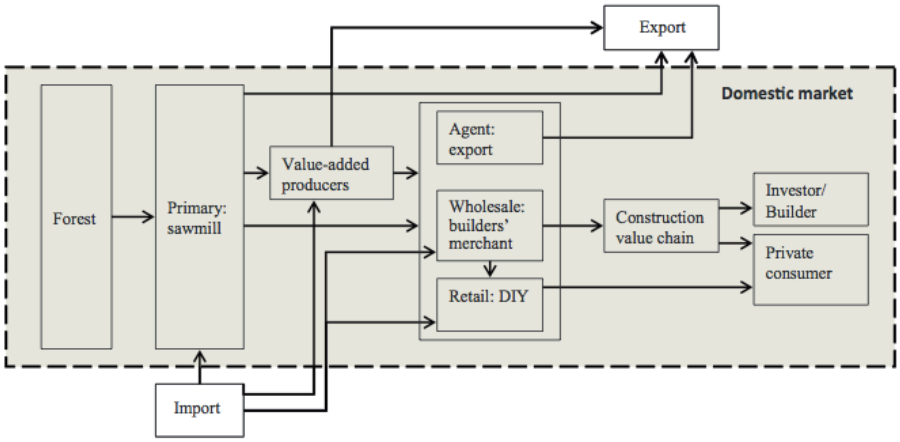


Figure 2. Wood products industry value chain from Räty et al. (2014), originally adapted from Nord (2005).

Finnish sawn timber is mainly used in the construction of its several forms. The most notable use ranges are framing construction and a wide range of interior products such as flooring, wall panels, moldings, doors, windows and furniture. (Finnish forest industries federation 2013a). The value chain of mechanical forest industry (Figure 2) can be divided into several stages, through which primarily (i.e. sawmilling, plywood, peeling or slicing into veneer) or secondarily (i.e. kiln-dried timber, laminated wood, decking, windows, furniture) processed wood products (Tissari 2009) are led to wholesalers, retailers and export agents or directly to the private end-users (investors, developers and private consumers) (Nord 2005, Räty et al. 2014).

1.2. Sustainable practices in forest industry

1.2.1. Commitments to sustainability issues

International commitments at the global level create the basis for long-term responsibility practices of companies. According to European Commission (2014), the definition of corporate social responsibility is:

> "Corporate social responsibility (CSR) refers to companies taking responsibility for their impact on society. As evidence suggests, CSR is increasingly important to the competitiveness of enterprises. It can bring benefits in terms of risk management, cost savings, access to capital, customer relationships, human resource management, and innovation capacity".

The main commitments regarding corporate responsibility are the UN Universal Declaration of Human Rights, the ILO Declaration on Fundamental Principles and Rights at Work, the OECD Guidelines for Multinational Enterprises and the UN environmental agreements. (Niskala et al. 2013). The UN Global Compact, strategic policy initiative for businesses, has disclosed goals such as empower local networks, engage stakeholders efficiently, ensure consistency of the Global Portfolio of Issues and emphasize the quality of implementation, enhance the governance accountability and framework, engage responsible business to support UN Goals and Issues and evolve a sustainable funding to achieve a desirable level of corporate sustainability in each, financial, environmental, social, and ethical, dimensions by 2016 (UN Global Compact 2014).

In addition, the goals of Corporate social responsibility set by the European Commission (2014), based on previously mentioned international commitments such as principles set by the UN, are focusing on:

> "Enhancing the visibility of CSR and disseminating good practices, improving and tracking levels of trust in business, improving self- and co-regulation processes, enhancing market reward for CSR, improving company disclosure of social and environmental information, further integrating CSR into education, training and research, emphasizing the importance of national and sub-national CSR policies and better aligning European and global approaches to CSR".

By using natural resources, the forest industry has a significant impact on the natural environment (Vidal and Kozak, 2008b) and the surrounding society (Panwar et al. 2010). Presently, the main concerns in a global scale are the ongoing depletion of natural resources, biodiversity reduction and climate change. Due to these facts, the forest industry has increasingly paid attention to the sustainable forest management and development. According to International Finance Corporation (2007), the environmental issues related to manufactured wood products and sawmilling (e.g. furniture manufacturing, plywood-, chipboard- and wood construction industry) are further defined as sustainable forest practices, solid waste generation, emissions to air, wastewater, noise and fire.

Moreover, increasing societal concerns and expectations about environmental issues of forest and globalization of the industry (Li and Toppinen 2011, Han et al. 2013)

have increased CSR practices in forest industry companies (Kärnä et al. 2003, Vidal and Kozak 2008a,b, Panwar et al. 2010, Li and Toppinen 2011, Han et al. 2013, Ranängen and Zobel 2014) since the 1990s (Hamann 2003, Mikkilä and Toppinen 2008, Malmelin 2011, Pappila 2013, Ranängen and Zobel, 2014). However, the discussion on the environmental sustainability in the forest industry started in the 1970s after receiving large-scale criticism from the public (Panwar et al. 2006, Vidal and Kozak 2008b, Ranängen and Zobel 2014).

The environmental discussion among forestry begun with concerns about emissions to water and air in the 1970s and continued to recycling, chlorine bleaching, forestry and forest management by the early 1990s. In the mid-1990s, the emphasized sustainability topic was forest certification (e.g. PEFC and FSC), which has been essential in sustainable forest management, in preventing illegal logging and contributing tracking systems of wood products (Ranängen and Zobel 2014). Nevertheless, Vidal and Kozak (2008b) claim that albeit forest certification has been one of the most effective mechanisms for sustainable forestry, the public has been criticizing it. The object of the criticism has been the implementation of the certification programs in forest companies' operations. However, all the principles and criteria must be fulfilled before certification can be granted (Programme for the Endorsement of Forest Certification schemes 2014, Forest Stewardship Council 2014).

During the 21st century, the role of forest industry in the global climate change has become more crucial. According to Panwar et al. (2006), forest industry has responded to environmental issues such as the climate change by reducing pollutant emissions and being more energy efficient. Forests have a unique ability to capture and store carbon dioxide from the atmosphere, and due to the climate change can be reduced by increasing sustainable use of wood and resetting the focus of consumption on renewable materials (Finnish Forest Industries Federation 2014b). While the production has increased, the emissions to air and water have been reducing significantly over the past decades. For instance the carbon dioxide (CO_2) emissions have reduced by 30% in 20 years in the forest sector (Finnish Forest Industries Federation 2013b). In addition, the target set by the European Union to reduce greenhouse gas emissions by 20% below the year 2005 level, to increase the

share of renewable energy to 20% of the final energy consumption and to improve energy efficiency by year 2020 (Kivistö et al. 2013), affect strongly to the environmental and corporate responsibility commitments of the forest industry (Finnish Forest Industries Federation 2013b).

Accordingly, the growing amount of forest industry companies exploit either ISO International standards (e.g. ISO 14000 for the environmental management), forest certification programs (e.g. PEFC, FSC), the United Nations Global Compact (UNGC) principles for human rights, labor, environment and anti-corruption or a platform provided by the World Business Council for Sustainable Development (WBCSD) as a strategic tool to enhance companies' position in their operational environment (Li and Toppinen 2011).

1.2.2. CSR implementation

Corporate social responsibility (CSR) became more familiar to the European forest products industry by the mid-1990s once publication of environmental reports became more common (Panwar et al. 2006). Since that, CSR has been increasingly gained more attention within the global forest sector (Vidal and Kozak 2008b). The sustainable development or sustainability is strongly related to CR and CSR, and these three definitions work synonymously as they all include at least economic, social and environmental aspects (Vidal and Kozak 2008a). Recently, the concept of shared value (CSV), introduced by Porter and Kramer (2011), was created to complement the concept of social responsibility. The primary focus of CSV is that in pursuance of creating economic value for shareholders, companies generate added value for society. The concept of shared value enhances more companies' competitiveness than social responsibility, which weights more equally different dimensions of sustainability whereas CSV practices are based on achieving economic success while contributing economic and social conditions in surrounding community. (Porter and Kramer 2011, Niskala et al. 2013).

According to Han et al. (2013), the "triple-bottom line" -model (economic, social and environmental aspects) by Elkington 1997 is commonly used in the forest sector

to conceptualize CSR implementation. However, Kärnä et al. (2003) and Vidal and Kozak 2008a,b note that in the case of forest sector the primary focus has been on the environmental performance over the social dimension. As the forest sector utilizes natural resources in their operations, the emphasis on environmental issues can be expected. The criticism regarding the imbalance between the implementation of the dimensions has successfully led to a situation that forest companies are paying more attention to social and economic features together with environmental issues (Panwar et al. 2006, Vidal and Kozak 2008a, Han et al. 2013).

Integrating economic, social and environmental dimension into coherent business strategies has led the forest companies towards more holistic approach to CSR (Panwar et al. 2006, Vidal and Kozak 2008a,b). According to Han et al. (2013), the forest companies have begun to set emphasis on the social dimension of CSR. On the other hand, albeit the forest industry has been working closely with legislators and other stakeholders to improve its responsible practices (Finnish Forest Industries Federation 2013b), increasing public demands and stakeholder pressure about CSR (Vidal and Kozak 2008b, Han et al. 2013) signify that they have still room for improvement (Vidal and Kozak 2008b, Finnish Forest Industries Federation 2013b). Nevertheless, according to studies of Vidal and Kozak (2008a) and Carroll (1979), CSR practices tend to be sector and context specific, which can affect how companies prioritize their CSR implementation activities. Thus, environmental factors appear to be more emphasized than certain social issues (e.g. child labor), albeit a forest company has a wide range of CSR practices in which it can be engaged (Vidal and Kozak 2008a).

According to a review by Li and Toppinen (2011), common CSR implementation themes in the forest companies are recycling, certification, community, air, water, energy, procurement, safety, education, stakeholders, employment, health, consumption, R&D, philanthropy, culture, and the rights of indigenous peoples. These themes can be divided into three categories: economic, social and environmental. However, as mentioned previously, the corporate responsibility commitments of the forest industry are mostly based on recognizing environmental aspects of forestry. As a result of climate change, the forest industry has focused even more on contributing to non-fossil fuel based bioeconomy.

As reported by European Commission (2012) and Finnish Forest Industries Federation (2014b), the forest industry has an important role in discussion of climate change and bioeconomy since the industry is producing wood-based renewable and sustainable raw materials such as biofuels, heat and electricity as a substitute for fossil-based materials and energy. In addition, forests store CO_2 from the atmosphere, hence counteracting greenhouse gas emissions and reducing climate change. In other words, the forest industry is responding to the increasing demand for sustainable development and sustainability practices, especially in the case of environmental issues. This improves the competitiveness of the whole forest industry compared to the other industries working in the same field for example plastic industry and concrete industry (Draper 2006). Nowadays in beside of the traditional forest products, the highest prospects for growth in the forest industry are in bioenergy, pulp, high value-added wood products, chemicals, textiles and biomaterials, as well as in creating services (Hänninen et al. 2013). In addition, the wood products industry has developed new industrial solutions for building multi-storied constructions made of wood, which is highly competitive in comparison to other building materials such as steel and concrete (Kivistö et al. 2013).

On a company level, the competitive advantage within the industry can be achieved by using CSR initiatives in core business strategy and practices of a company. Corporate responsibility practices enhance company's reputation and image in the eyes of its stakeholders. (Johnson and Walck 2004, Panwar et al. 2006, Li and Toppinen 2011). As Niskala et al. (2013) note, corporate responsibility issues are related to the company's competitiveness in several ways, ranging from risk management to a source of new business opportunities.

In the forest industry, the forest certification system is widely used operation towards sustainable development, working as a market mechanism in choice making process of customers. In addition to other green labels, the certification label symbolizes responsible choice that one can conduct. Customers may be willing to pay a premium for a product originated from the sustainably managed forests. (Li and Toppinen 2011).

1.2.3. Concept of sustainability

The concept of sustainability can be realized on four different hierarchical levels that are called societal, sectoral, corporate and product level (Figure 3). **Societal** sustainability, as a more extensive level of the sustainability concept, includes strategic decisions, regulations and operations related to sustainable development in a global scale. The societal level has a significant impact on other three levels in terms of national and international regulations and commitments, which create limitations and sanctions for society, governments, companies, organizations and individuals as well as their actions. As mentioned in the previous section, such as UN Global Compact and OECD Guidelines for Multinational Enterprises are instances for implementation of the societal sustainability strategies.

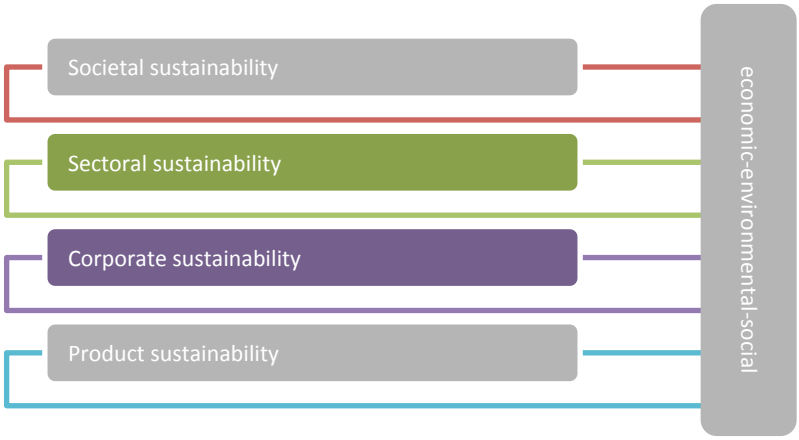


Figure 3. Four hierarchical levels of sustainability.

The main focus of **sectoral** sustainability level is to maintain or enhance the current reputation of a sector in responsibility issues and hence to improve competitiveness in relation to other sectors. The Finnish Forest Industries Federation (2013b) depicts sectoral approach to sustainability by dividing responsibility into dimensions of society, natural resources and environment presented in Figure 4. Regarding society aspect, the sector responds to the needs of individuals and society by providing sustainable solutions and innovations based on a renewable raw material. Moreover, the forest sector enhances responsibility actions towards stakeholders on the national and international level by setting requirements to partners and by conducting an active dialogue with key stakeholder groups. As illustrated in the dimension of natural resources, the sector promotes the use of forest certification and the utilization of forest management to develop biodiversity. From the environment

viewpoint the sector improves energy, material and water-use efficiency and minimizes environmental impacts throughout production chain.

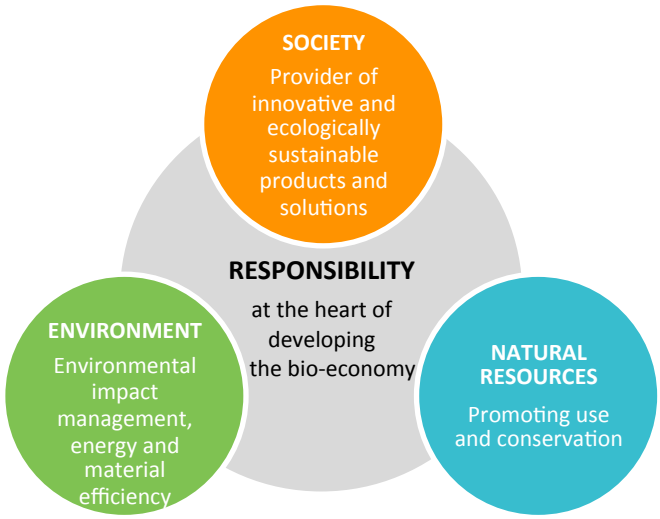


Figure 4. Responsibility dimensions in Finnish Forest industry (Finnish Forest Industries Federation 2013b).

The sustainability on **corporate** level encompasses the current state and standards of corporate social responsibility that have been already covered in previous chapters (see Chapter 1.1.1 and 1.1.2). The **product** sustainability level is about how consumers perceive the values of environmental and social sustainability in products that they are purchasing. A corporate strategic decisions-making process can affect aforesaid values of a product. The safety aspect and health impacts of a product are emphasized (Toppinen et al. 2013) likewise the labels of forest- and chain-of-custody certifications that convey information about sustainability of wood products to customers. (Räty et al. 2012).

The main emphasis of this study is limited to sectoral and corporate sustainability levels. This study is carried out by examining emerging sustainability themes and the current state of stakeholder orientation on online communication from both corporate and sectoral levels. However, a cross-section of the most important topics of product sustainability has been formed through a few themes. Fully focusing on the societal and product sustainability levels would require further research.

1.3. Corporate sustainability communication and stakeholders' role in it

As the corporate social responsibility became a well-known concept in the business world during the last decade, various industries operating internationally such as forest industry has adopted CSR reporting routines to communicate with their stakeholders about their sustainability practices in three different dimensions: economic, social and environmental dimensions (Mikkilä and Toppinen 2008).

Most of the companies dealing with sustainability concept are exploiting web-based communication tools, due to their easy access and low costs, to increase the public awareness of the company's impact worldwide. (Panwar et al. 2006). In addition to corporate reports including environmental reports, annual reports and CSR and sustainability reports and project reports (Li and Toppinen 2011), company's official websites form a significant part of its sustainability strategy and communication (Unerman 1999).

Finding the optimal scope of corporate sustainability communication can be seen as a central issue in terms of company's image-building and creating reputation that is highly connected to stakeholders' demands and expectations for company's accountability, reliability and visibility (Kuisma 2004, Vidal and Kozak 2008a, Mikkilä and Toppinen 2008). In this case, stakeholders are widely defined as groups or individuals, who can be affected by a company's actions or who have an impact on a company's operations. Stakeholders of a company can be for instance determined to society, general public, non-governmental organizations, consumers, media, financers and employees. (Niskala et al. 2013). As previously mentioned, the awareness of stakeholders towards corporate responsibility and the discussion of CSR practices of a company have increased (Panwar et al. 2006). At times companies are facing increasing pressure from stakeholders, since issues interested by stakeholders are not necessarily the same that the company itself tends to communicate about. In general, companies want to highlight the positive development and progress of sustainability issues in their communication. (Halme et al. 2011).

Research on CSR communication has pointed out some criticism on how the communication of company's sustainability practices is implemented in their business operations vis-à-vis their actual performance (Mikkilä and Toppinen 2008, Li and Toppinen 2011), and not merely exploited CSR as a support function (Juholin 2004). In other words, from the context of liability disputes and communication has been emerged a term "green washing", referring to accusations of empty promises made by companies of respecting environment or having an impact on other sustainability issues (Halme et al. 2011). According to Halme et al. (2011) and Panwar et al. (2006), the concern towards "green washing" is not vain; using sustainability communication as a promotional tool in making business can turn against the company very easily. As a result of the criticism of corporate responsibility disclosure, Li and Toppinen (2011) and Panwar et al. (2007) proposed that by adopting external and internationally accepted standards, such as Global Reporting Initiative (GRI) including economic, social and environmental impacts, the quality of sustainability reporting could be improved. Li and Toppinen (2011) emphasize the importance of interaction between a company and its stakeholders to develop corporate responsibility even further and to conserve the company's social legitimacy from the possible loss by adopting CSR practices. Legitimacy loss can lead for instance to consumer boycotts and environmental and social activism, which can affect negatively to the economic performance of a company. In order to retain company's societal legitimacy and to maximize the long-run financial viability, corporate responsibility can be understood as a tool for companies to reflect the concerns and needs of their stakeholders.

Panwar et al. (2006) and Dawkin (2004) point out that the main concern companies are facing in their CSR communication is related to diverse expectations of stakeholders and company's ability to respond to these different expectations. The suggestion to improve imbalance of communication by developing a clear and strong communication strategy tailoring the content of it in accordance with the image and desired reputation of the company. Also, Halme et al. (2011) note that active communication with stakeholders i.e. sharing goals and views and giving a chance to have an influence on a decision-making process, progresses the transparency in a company's performance. However, there can be observed some issues related to CSR communication; does CSR communication correspond to corporate responsibility

actual performance, how to respond to demands of stakeholders and how to communicate with different stakeholders? In this study, one of the aims is to respond to the latter issue about stakeholder communication and to resolve the current state of sustainability-related online communication along with the most topical sustainability themes in wood products industry.

2. Purpose and implementation of the study

Previously, there have been several studies examining CSR reporting actions of forest-based companies and benefits of corporate responsibility in forest industry (Kärnä et al. 2003, Panwar et al. 2006, Vidal and Kozak 2008a,b, Li and Toppinen 2011, Han et al. 2013). This study focuses on the sustainability perspective of online communication in Finnish wood products industry and aims to explain how companies and associations involve their stakeholders in their sustainability communication. The purpose of this research is to clarify how companies and associations implement their sustainability actions in online communication and at which stakeholder groups the sustainability-related online communication is targeted the most comprehensively. This research addresses online communication on official websites of wood product industry through four segments that are large companies, family businesses, associations and bioenergy producers in Finland.

This leads to the main research questions of the study:

1. What is the current state of sustainability-related online communication in wood products industry?

2. Which are the main topical sustainability issues identified in a process by European-level stakeholders and how these issues are communicated in wood products industry?

3. What is the role of different stakeholder groups in defining the content of sustainability communication and how organizations engage them in online-based sustainability communication in wood products industry?

The theoretical part of the study, based on previous researches and literature, focuses on corporate responsibility models and the concept of sustainability on corporate and sectoral levels. Also it reviews the process of online communication and stakeholder theory behind the concept of CSR. The hierarchical levels of sustainability (see

Figure 3) operate as a wider context whereas the stakeholder orientation of the forest products industry (see Figure 9) forms a framework of the study. More accurate examination of societal and product levels of sustainability is not relevant for this study since they have their own forums. An empirical data collected from websites of companies and associations in wood product industry will be analyzed by using Atlas.ti software. The data analysis is based on identifying the current sustainability themes emerged from the online communication (inductive content analysis), viewing the data through given sustainability themes (deductive content analysis) and examining how companies are involving their relevant stakeholders in the discussion of their sustainability practices and implementation.

3. Theoretical background of the study

3.1. Approaches on corporate responsibility and sustainability actions

The concept of corporate responsibility and sustainable development is frequently divided into three dimensions: environmental, economic and social dimensions (Roca and Searcy 2012, Niskala et al. 2013, Costa and Menichini 2013). The prominent operationalization of the multi-dimensional construct of CSR is the "Triple-bottom line" (TBL) -model (Elkington 1997), described also as a "3P" (people, planet, profit) approach (Marrewijk 2003, Hana et al. 2013). The main idea behind TBL is that the business has an extended goal including environmental and social value instead of just having one single goal generating economic value (Elkington 1998).

In 2012 at Rio+20 Conference, the United Nations agreed international guidelines and goals on sustainable development focusing on confirming economic, ecological and social sustainability and particularly on the improvement of green economy (United Nations 2014). In general, the sustainable development based on definition set by the UN requires following elements according to Ministry of the Environment (2013) in Finland. The content and quality of **economic sustainability** is grounded on the balanced growth of economy such as long-term debts and disposal of reserves. The sustainable economy is essential for key functions of society. Economic policy, persistently aiming to sustainable economy, creates favorable conditions for fostering and increasing national welfare. The key issue in **social sustainability** is to ensure the transition of conditions of well-being from one generation to another. The continuing growth of population, poverty, food and health care, gender equality, as well as arranging education are world-wide challenges of social sustainability that have a significant impact on the ecological and economic sustainability. Based on **ecological sustainability**, the fundamental condition of sustainable development is the preservation of biodiversity and ecosystem as well as adaptation of financial and material operations to natural endurance in long-term.

The definition of sustainable development set by the UN and the "triple bottom line" -model on corporate responsibility are commonly used in forest industry companies (Programme for the Endorsement of Forest Certification schemes 2014, Han et al. 2013). According to Panwar et al. (2006), Niskala et al. (2013) and Costa and Menichini (2013) the three dimensions of corporate responsibility are described as follows (Figure 5).

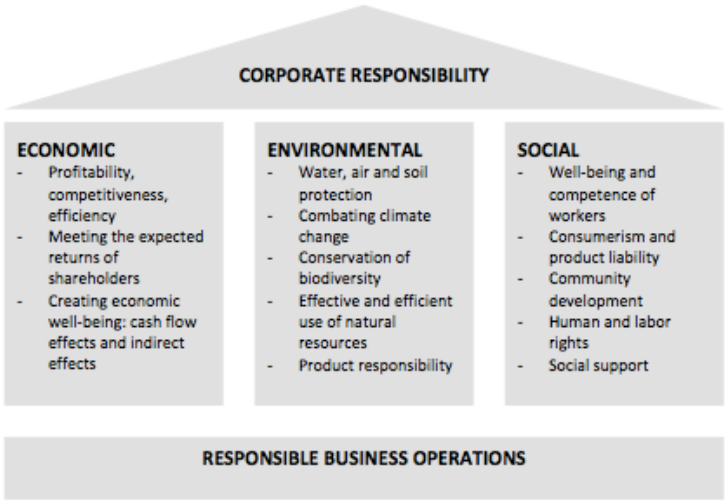


Figure 5. The multi-dimensional structure of CSR (Niskala et al. 2013).

Economic responsibility relates to the fact on how the economic added value generated by economic activities of a company is divided between the company and its various stakeholders. For instance, the implemented economic added values for stakeholders are effects of direct cash flow, such as salaries of employees, purchases from suppliers and tax payments to society. In addition, the indirect economic impacts on the company stakeholders consider for example the significant impacts of industry on the national economy, investments and indirect employment impacts. These indirect impacts as well as direct impacts provide significant public and economic benefits. In that sense, the forest industry is no distinct regarding sustainable and robust increases in company profitably and value that are implicit for the company's shareholders (Panwar et al. 2006).

Social responsibility encompasses, in turn, the effects of a company activities on society including employees' well-being and work practices, safety protection, human rights, product liability and consumerism issues, practices in the corporate network as well as relations with the local community and society. As a result of increasing environmental consciousness, the social responsibility has become an essential aspect of CSR for forest industry companies. In this regard, it is important that forestry companies efficiently balance conflicting stakeholder demands and interests for instance rights and cultural traditions of indigenous people with social and economic responsibilities. (Panwar et al. 2006, Niskala et al. 2013).

In terms of **environmental responsibility**, the key issues are sustainable use of natural resources, energy and water consumption, biodiversity protection, combating climate change i.e. reducing gas emissions, water recycle and the environmental impacts of product in its entire life-cycle as well as impacts of the value chain. Through the impacts of inputs and outputs of company's processes, companies have a crucial role in global sustainable development. As mentioned previously, forest industry among other environmentally-sensitive industries, has responded to increasing public concerns towards environmental issues by focusing on sustainable use of natural resources and by preventing climate change e.g. through reduction of pollutant emissions and energy efficiency. In addition, majority of forest companies in Finland have adapted certification standards and operations in their business actions to ensure sustainable forest management and to prevent illegal logging (Panwar et al. 2006, Li and Toppinen 2011).

Some previous studies have indicated that environmental dimension has been largely emphasized in the forest sector in case of corporate responsibility (Brearton et al. 2005, Kärnä et al. 2003, Vidal and Kozak 2008ab, Han et al. 2013). However, recent studies (Vidal and Kozak 2008ab, Li and Toppinen 2011, Han et al. 2013) point out, that the increasing multi-stakeholder pressure has resulted in increasing importance of social responsibility and more holistic approach of CSR in forestry. According to findings from previous studies, companies have to prioritize their CSR activities depending on the context (Vidal and Kozak 2008a, Niskala et al. 2013). In other words, corporate responsibility tends to be sector-specific (Carroll 1979), and so it depends on the industry in which CSR activities a company is involved.

Nevertheless, according to Porter and Kramer (2011), in the concept of corporate responsibility, the sustainability issues are out of a company's core business. The discussion focuses excessively on the problems of relationship between companies and society, and not on the fact, that both need each other to be successful. (Niskala et al. 2013). To solve this question, Porter and Kramer (2011) provide the concept of shared value, which concentrates on the company creating economic value and achieving economic success in the way that creates value for society by enhancing the economic and social conditions in communities in which the company operates. For instance, companies have significant potential to innovate and produce products and services that meet the real needs of society and consumers. When the products and services of a company are examined through the concept of shared value, new opportunities for further innovations may open up. (Niskala et al. 2013).

3.1.1. Appearance of sustainability in sectoral level

Rather than solely approaching sustainability issues at the corporate level, the importance of sectoral level in sustainability development and in a context of competitiveness have increased. Sector representative bodies and trade associations have more power to make decisions concerning sustainability issues such as climate change, health and safety impacts as well as child labor. However, the success of improving sustainability standards requires collaboration in addition to sector bodies with other companies, organizations and suppliers in the same sector. (Draper 2006).

In Table 1, Draper (2006) introduces five-step model for sector change towards corporate responsibility. First approach focuses on creating a long-term **vision** of sustainability in sector-wide providing long-term goals to follow up and through that identifying the key challenges to focus on. The success of this approach, however, requires (1) having an explicit framework and timeline to achieve the vision, (2) working together with stakeholders to ensure mutual understanding about the nature of the vision, (3) having industry-wide agreement on the key challenges and (4) developing visions that lead to an evident framework for action for instance through voluntary standards like forest certifications.

Table 1. Advantages and disadvantages of the five sector approaches (Draper 2006).

Approach	Advantages	Disadvantages
Visioning	Clear long-term view and route map Future proofing Stakeholder input	Can't be a talking shop with no consensus or action Risk being too high level
Leadership	Respond to core business needs Opportunity based Drives tomorrow's standard practice	Can generate laggards Risks duplication of effort Limits to trail blazing
Partnership/market based	Market-driven solutions Partnership approach creates innovations	Limited reach – single issue based Relies on consumer understanding and taking action
Political	Universal improvements Policy supports business case	Partnership is time consuming Hard to get right Bureaucratic Political reluctance
Education	Building long-term understanding and skills	Cannot operate in isolation Loss of momentum

In addition to advantages of this approach, the risk of the approach may lean on inaction resulting from endless discussion. **In the leadership** approach, a company with a strong business case becomes a leader and an example, which others start to follow (Draper 2006). As McDonald and Young (2012) note, companies that are operating more proactively attempt to be leaders within their industry while others content themselves with obeying the minimum standards as set by law. A competition within the sector resulting from the scenario of leadership model may produce new innovative ideas to promote sustainable development. However, this approach does not ensure that changes are made in companies across an industry and in contrary other companies can be differentiated in other terms than the leading company. (Draper 2006).

Third model, the **partnership/market-based** model, concentrates on specific industry-wide issues and challenges that are critical for cross-sectoral companies, stakeholders and industry bodies to collaborate on (Draper 2006). By accepting cross-sector collaboration (relationships involving two or more sectors) as an effective means of addressing societal problems, partners sought to gain a mutual goal of achieving organizational and societal objectives (McDonald and Yong 2012). For instance, among various voluntary standards as a result of partnership, forest certification systems such as FSC and PEFC set high standard for sustainable forest management. Products with a certification mark aim to lead consumers' purchase

behavior towards more responsible choices (Draper 2006). McDonald and Young (2012) claim that, especially, partnership-model can be interpreted within companies operating in high risk or environmentally sensitivity industries that receive eminent stakeholder pressure. These companies improve their sustainability practices to enhance their reputation and their legitimacy. The success of partnership-based model rests on building a strong brand that consumers recognize and will buy, and thus the model is restricted to a single issue (Draper 2006). Moreover, collaborative relationship can inflict the creation of innovative solutions and new ideas, improvement of effectiveness and efficiency of issue management, as well as shared accountability (McDonald and Young 2012).

Instead **political** model drives further sector-wide corporate responsibility by delivering universal improvements in policy interventions such as regulations or fiscal incentives (Draper 2006). Recently, in December 2014, European Union amended requirements on Transparency and Social Responsibility (PE-CONS 47/14) that demand further improvements on disclosure of non-financial and diversity information from certain European large companies. The aim of directive is to strengthen the transparency and accountability of social and environmental information (European Union 2014). Nevertheless, policy interventions made in EU or on the national level do not necessarily apply on the international level and they may encounter reluctance among companies whose business activities are restricted significantly by regulations (Draper 2006).

The fifth approach, **education** model, focuses on ensuring sectoral transformation in the future by including corporate responsibility in education framework of a particular profession for instance in Universities teaching programs at an early stage. The drawback of the model is based on depending on ability of individuals to apply corporate responsibility to their actions. (Draper 2006). As Draper (2006) states and describes in Table 1, the awareness of the five models enables to combine approaches into a long-lasting model for sector change. The combination of approaches furthers sector performance on sustainability and sectoral competitive advantage. To achieve the effective change and to maximize the value to business and sectors, it is necessary to choose the optimum combination of approaches for an industry sector.

3.2. Stakeholder theory

Contrary to the CSR approach, the stakeholder approach starts by examining at various stakeholders to whom the company is responsible for instead of focusing on the company and its responsibilities (Crane and Matten 2007). However, in the broader sense of CSR, the stakeholder theory can be encompassed as a part of CSR theory, due to it contributes a normative outline for responsible business to society (Melé 2008).

The existence of a company depends on stakeholders' willingness to collaborate with the company and provide the input to business activities of the company (Niskala et al. 2013). Due to that, stakeholder theory (Freeman 1984) is the most notable and influential theory in addressing sustainability, as companies have obligations to their stakeholders, and stakeholders affect and are affected by companies (Roca and Searcy 2012). In the same context, Clarkson (1995) defines a stakeholder in more precise way:

> "Stakeholders are persons or groups that have, or claim, ownership, rights, or interest in a corporation and its activities, past, present or future. Such claimed rights or interests are the result of transactions with, or actions taken by, the corporation, and may be legal or moral, individual or collective."

Moreover, stakeholders provide companies with a wide range of resources companies need to operate their business such as capital from shareholders and owners, customers to buy their products or services, employees, legitimacy and materials (Deegan 2002, Golob and Barlett 2007). According to European Commission (2011), as CSR obliges engagement with stakeholders, it permits companies to better anticipate and exploit of fast changing societal needs and expectations as well as operating conditions. This may lead to development of new markets and generate opportunities for a company's growth.

Stakeholders can be classified into primary or secondary categories. *Primary stakeholders* (employees, owners, customers and suppliers) are the groups to which a company has a formal, contractual relationship, and without their continuing participation the company cannot cope with its business. In general, the

interdependence between the company and its primary stakeholders is very high. *Secondary stakeholders*, in turn, have an impact on a company's actions but they are not engaged in transactions with the company and thus not crucial for the company's survival. The NGOs and media, for instance, are regarded as secondary stakeholders. Even if they are not as essential as primary stakeholders for the company, they can still cause significant damage to them. (Clarkson 1995, Niskala et al. 2013).

On the other hand, stakeholders can be divided into internal and external stakeholders (Figure 6). *Internal stakeholders* including employees, managers, owners and shareholders work for the business directly and they are affected by the company's actions instantaneously. In other words, internal stakeholders, as a part of the company's daily operations, can be perceived as a part of its strengths and weaknesses on a market. In addition, they are mutually dependent on each other. The *external stakeholders* (e.g. customers, suppliers, society) may affect the opportunities and threats of the company. (Mark-Herbert and von Schantz 2007, Costa and Menichini 2013).

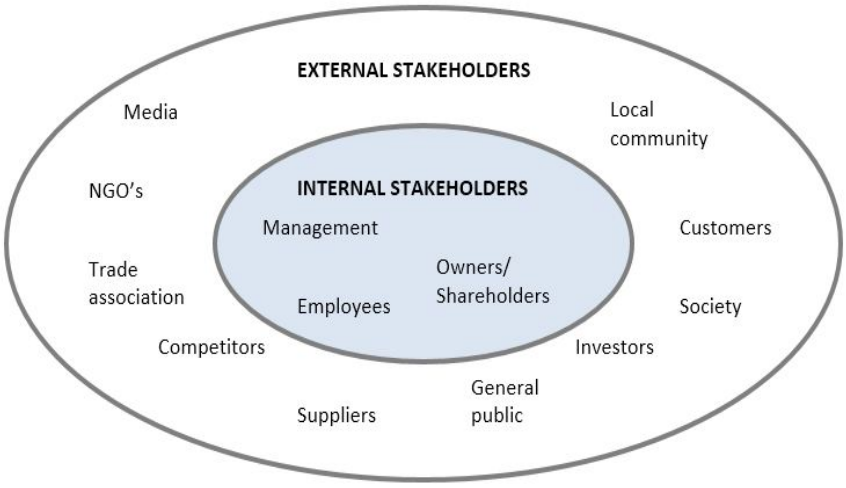


Figure 6. An example model for a company's internal and external stakeholders, adapted from Mark-Herbert and von Schantz (2007).

The aim of the stakeholder theory is to provide guidelines in comprehending company's behavior and identify the impact of stakeholders on company's operations. Despite the relevance and prevalence of the stakeholder theory, it is more implicit rather than explicit in the literature. The popularity of the stakeholder theory

has led to emerge of different forms of the theory involving in different methodologies, criteria of assessment and types of evidence. (Donaldson and Preston 1995).

One of the well-known approaches towards stakeholder theory is provided by Donaldson and Preston (1995). In this case, the stakeholder theory consist three mutually supporting aspects divided to normative, descriptive and instrumental stakeholder theory. The *normative* approach addresses the company's function in the matter of moral obligations to its stakeholders as well as the value and importance of stakeholders to company's business. In turn, *descriptive*, also known as empirical, stakeholder theory is based on whether and how the company responds to needs of its stakeholders and takes into account their interests. In addition, from the company's perspective, the theory can be used to describe behaviors and characteristics of the company in more deeply manner including for instance nature of the company, managers' opinion on the managing system and how the company is actually managed (Donaldson and Preston 1995).

The *instrumental* level of the theory examines whether considering needs and interests of stakeholders are beneficial for the company. Along with empirical data, the instrumental theory is used to identify accomplished goals (e.g. profitably) of a company and connections between management of stakeholders (Donaldson and Preston 1995). (Crane and Matten 2007, Jamali 2008, Roca and Searcy 2012). According to Jamali (2008), due to limited resources and bounded rationality, companies must prioritize their stakeholders according to considerations of instrumental and/ or normative stakeholder theory rather than trying to meet the needs of all stakeholders.

As previously mentioned, stakeholders' demands and expectations towards company's CSR practices may imply conflicting needs and interests. This can be a challenge from the company viewpoint when trying to satisfy various needs of different groups of stakeholders (Mark-Herbert and von Schantz 2007). Nevertheless, it has been discussed that regardless of the impact of stakeholder power, all of them should be served equally (Deegan et al. 2000). On the other hand, by having different priorities for various stakeholders, companies should target

sustainability reports to stakeholders by using different indicators (Roca and Searcy 2012). Another way of covering these issues is to categorize stakeholders with similar interest (authorities, financial actors, business partners, customer groups and external influence) into a group to address certain corporate responsibility issues (Clarkson 1995, Dowling 2001).

Table 2. Key stakeholders of the company and CSR actions towards each stakeholder (Papasolomou-Doukakis et al. 2005, Longo et al. 2005, Panwar et al. 2006, Morsing and Schultz 2006).

Stakeholder	Actions towards key stakeholders
Employees	Healthy and safety work environment Responsible human resource management Employee development Employment diversity and social equity Wellbeing and satisfaction of employees Quality of work
Suppliers	Fair trading transactions with suppliers Selection and analysis system of suppliers Partnership between ordering company and supplier
Customers	High quality products and service Safety of products and service Consumer protection Transparency of product information
Shareholders (i.e. owners) and Investors	High profits and competitive return on investment Fair and honest business practices in relationship with shareholders Meet the expectations of shareholders and investors
Community	Stable employment for community members Creation of added value to the community Commitment to sustainability development Environmental safety and production
General public	Implementation of economic, environmental and social sustainability Efficient and open information and communication flow about a company's sustainability activities and other business operations via e.g. media, websites, annual reports Sustainability initiatives Regulatory compliance (i.e. laws and regulations)

To subsist, the company has to identify its stakeholders and key stakeholders (see Table 2), who have a significant impact on business operations and core strategy of the company, and to fulfill needs of the key stakeholder groups in the long term (Niskala et al. 2013). For instance, civil society organizations and trade unions bring pressure for improvement. They identify issues and problems and co-operate with enterprises to build new solutions. Investors and consumers, instead, advance market reward for socially responsible corporates through the investments and consumption

whereas media raises awareness of companies' actions and decisions they make. (European Commission 2011).

In addition, even when the primary concern of a company is to serve its key stakeholders, its success in acting so is probable to be affected by other stakeholders (Foster and Jonker 2005, Hawkins 2006, Jamali 2008). However, stakeholders are not generalized to correspond to all companies, due to different companies have different stakeholders (Roca and Searcy 2012).

Recently, the stakeholder theory has been focusing on developing long-term mutual relationships with stakeholders rather than concentrating on short-term transactions that provide just immediate profit for the company. The emphasis has changed from the old fashioned mindset where companies managed their stakeholders, to a focus on the interaction between companies and their stakeholders. Based on that, motivation, skills and capabilities of the company in managing relationship with its stakeholders, have become more crucial in discussion of CSR practices. (Morsing and Schultz 2006).

3.3. Sustainability communication

Sustainability communication can be determined as a sensitive form of corporate communication. Through corporate responsibility communication the company should strive the truth instead of fiction, to improve company's image directly with given message. However, promoting itself as a responsible operator and as a caring corporation does not automatically improve company's reputation. (Halme et al. 2011). Companies are facing some difficulties in communicating sustainability including for instance skepticism from the public towards company's CSR activities and possible inimical reaction from media, NGOs and other stakeholders. For this reason, companies should concentrate on the clarity rather than overly positivity of communication. (Halme et al. 2011). Moreover, the different information requirements of various stakeholder groups adduce certain communication challenges concerning communication channels as well as the form and content of a message (Dawkins 2004, Halme et al. 2011). Often numerical and detailed standardized data reports of responsibility are in place for the investors and

authorities whereas consumers require a clear message that appeals to their emotions (Halme et al. 2011).

According to Dawkins (2004), to produce efficient communication on sustainability issues, a company must fulfill four the most essential requirements. First, the company needs to create a clear communication strategy, considering which aspects of the responsibility program are the most suitable with the concerns of its stakeholders and company reputation. Second, a company should customize the channel, style and content of communications to meet various expectations of the different stakeholder groups. This includes maintaining comprehensive consistency of company's message along with involving stakeholders when developing communication on sustainability. Third, the company needs to ensure the conformity and coherence of the company's communication when coordinating sustainability messages. The most efficient communication may comprise embedding CSR messages in mainstream communications. Fourth, the company must take into account internal communication channels (e.g. product/label itself, marketing campaigns, voluntary CSR reports, corporate website and informal word of mouth) together with traditional communication channels.

Following chapters address more in detail on different channels of sustainability communication, especially the online communication, and stakeholder dialogue on sustainability issues of the company.

3.3.1. CSR reporting

Wider reporting on sustainability issues has been growing rapidly since the late 1980s, when the first environmental reports were published. CSR reporting has become a common value on the markets especially for the large organizations. (Roca and Searcy 2012, Niskala et al. 2013). The sustainability-related reports are key channels for communicating with stakeholders on sustainability activities of the company and achieving legitimacy as well as developing mutual understanding (Golob and Barlett 2007) particularly with the general public being a primary target audience (Dawkins 2004). Granting that the lacking of universally accepted

definition of sustainability reports, according to definition provided by Daub (2007), the sustainability report

> "… must, in other words, contain qualitative and quantitative information on the extent to which the company has managed to improve its economic, environmental and social effectiveness and efficiency in the reporting period and integrate these aspects in a sustainability management system."

To same extent, the guidelines for corporate sustainability reporting emphasize in general that CSR reports should contain a description and the sustainability vision of the company, its goals towards sustainability and several of indicators illuminating the performance of the company among other issues related to sustainability (Roca and Searcy 2012).

From several sustainability reporting guidelines and frameworks, the most widely known guideline is the Global Reporting Initiative (GRI), which among the other frameworks (e.g. OECD Guidelines for Multinational Enterprises, ISO 26000 and UN Global Compact) helps companies to recognize their responsibility issues, to measure their performance and to improve their transparency in that matter. The aim of the GRI is for companies to follow sustainability reporting standards in practice. According to findings by Roca and Searcy (2012), the indicators used in the sustainability reports were relatively evenly categorized along the triple bottom line model with its three different dimensions (economic, social, environmental).

In 2013, the fourth version of GRI (G4) was published in which the changes of international commitments and frameworks related to content of accountability have been updated as part of reporting guidelines. (Niskala et al. 2013, Global Reporting Initiative 2014). However, the corporate sustainability reporting as well as obeying reporting guidelines are voluntary for the companies, even though it is desirable from the stakeholder point of view. (Roca and Searcy 2012).

3.3.2. Stakeholder dialogue

In recent years, the communicational aspect as a part of company's image building has become an increasingly essential strategic issue for the company (Mark-Herbert and von Schantz 2007), especially involving stakeholders in a dialogue of its sustainability issues.

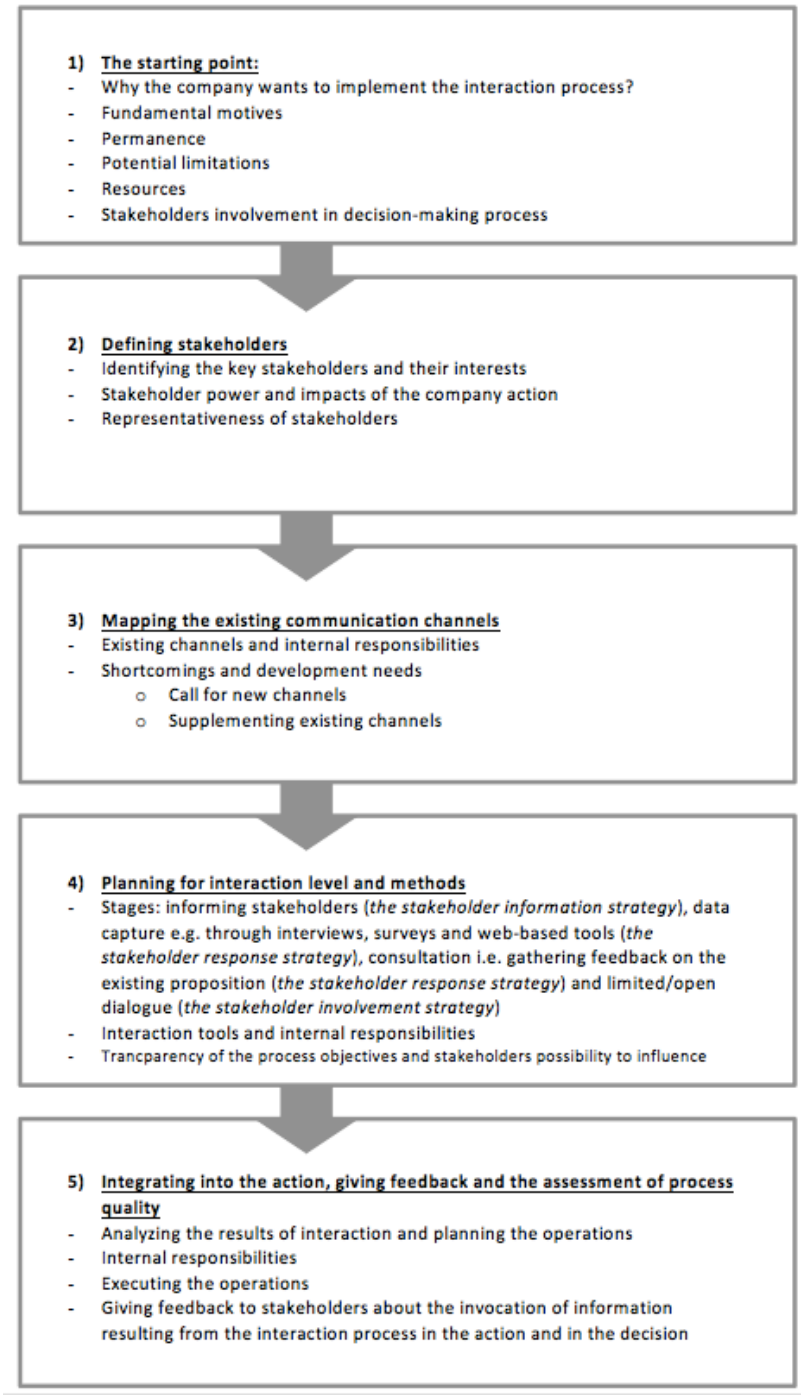
An active communication of company's goals and plans to its stakeholders contribute the transparency and openness of the company. Furthermore, in the corporate responsibility communication the company should take into account the views of stakeholders to achieve interactive communication and to avoid "green washing" outcome of the corporate image (Mark-Herbert and von Schantz 2007). Instead of a one-way communication, by sharing the objectives, the company provides an opportunity for stakeholders to influence the planning process, for instance, by allowing them to evaluate the objectives. Simultaneously, the publicity creates an additional incentive for the organization to achieve its goals. However, according to recent findings, majority of stakeholders find it difficult to communicate about the sustainability issues with companies. (Halme et al. 2011).

The following steps, at least, should be taken into consideration, when starting to implement the process of interaction: defining the baseline of interaction process, defining the relevant stakeholders in a sustainability dialogue, mapping of existing communication channels, selecting interaction methods and integrating them into the action, giving feedback and quality assessment of the process (Niskala et al. 2013). These following steps are described more precise in the Table 3.

In the stage 2 in Table 3, the general aim is to classify stakeholders based on the power and the extent of interest they have in company's activities. This is illustrated in the power-interest matrix (Figure 7) introduced by Cornelissen (2011). Particularly, 'key players', known as the key stakeholders of the company such as customers, employees, suppliers and shareholders, have an essential role in company's decision-making process and its operations (quadrant D). Likewise, stakeholders (quadrant B) with a high level of interest but a low level of power in company's activities need to be kept informed to ensure their commitment to the

company in the future and to give them a reason to spread positive word-of-mouth to others. In the contrary, stakeholders in the quadrant C with high power and low level of interest, are the most challenging ones for the company, due to they might use their power in reaction to a certain decisions or corporate activity. Stakeholders in quadrant A, however, are not as relevant as previous groups of stakeholders. In summary, the matrix model provides an insight into the importance, significance and influence of particular stakeholder groups towards the operations of a company in general.

Table 3. Phases related to the interaction process between a company and its stakeholders (Niskala et al. 2013).



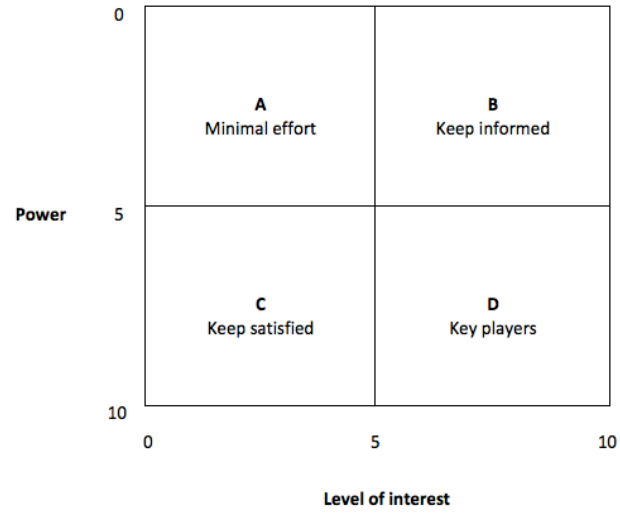
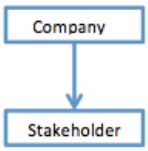
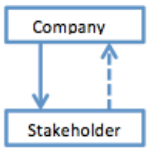
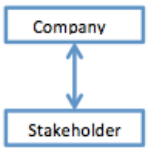


Figure 7. The power-interest matrix, adapted from Cornelissen (2011).

Based on Cornelissen's (2011), Morsing and Schultz (2006) characterization of different perspectives of sustainability communication, three communication strategies related to CSR can be pointed out: the stakeholder information strategy, the stakeholder response strategy and the stakeholder involvement strategy (Table 4). *The stakeholder information strategy* focuses on one-way communication from a company (message sender) to its stakeholders (message receiver). The purpose of the stakeholder information model is to reach a large audience, especially the general public and non-profit organizations (NGOs), by producing information in brochures, magazines, sustainability reports. Instead of, by using a two-way asymmetric communication, *the stakeholder response strategy* concentrates on changing public behavior and attitudes rather than changing the company as a result of the public relations. In that sense, by conducting feedback from the stakeholders in terms of figuring out the opinions and expectations of stakeholders, the company can utilize reported information to improve its sustainability efforts. However, the discussion between the company and its stakeholders is defective and rather sender oriented. In the contrary, the real two-way discussion, mutual dialogue, between the company and its stakeholders takes a place in *the stakeholder involvement strategy*, which is most recommended way to communicate nowadays. The ideal situation by engaging in symmetric communication model is to achieve a change in the company as well as in its stakeholder groups at the same time. In order to receive mutual benefit, it is necessary for the company to involve its stakeholders in the decision making process

for instance through the public consultation forums, various channels of social media such as Twitter, Facebook and ongoing surveys. (Morsing and Schultz 2006).

Table 4. Three CSR communication strategies, modified from Morsing and Schultz (2006).

	The stakeholder information strategy One-way symmetrical model of communication, public information	**The stakeholder response strategy** Two-way asymmetric communication	**The stakeholder involvement strategy** Two-way symmetric communication
			
Channels:	Press releases, brochures, magazines, annual, social and sustainability reports	Campaings, surveys, polls and other feedback forms	Public consultation forums, ongoing surveys, web-based tools, social media (Twitter, Facebook, LinkedIn and YouTube)
Stakeholders (e.g):	General public, government, NGOs, media	General public, customers	Key stakeholders
Stakeholder role:	Stakeholders influence: support or oppose	Stakeholders respond to company actions	Stakeholders are involved, participate and suggest corporate actions
Strategic communication task:	Inform stakeholders about favourable CSR decisions and actions of the company	Demostrate to stakeholders how the company integrates their concerns	Invite and establish frequent, systematic and pro-active dialogue with stakeholders
Corporate communication department's task:	Design appealing concept message	Identify relevant stakeholders	Build relationships
Endorsement of the company's CSR initiatives	Unnecessary	Integrated element of surveys, rankings and opinion polls	Stakeholders are themselves involved in the company's CSR messages

One worthy example of symmetric communication can be perceived in Stora Enso's case. In 2012 Stora Enso invited more than 300 representatives of different stakeholder groups to participate in the web-based brainstorming concerning about Stora's the most important sustainability themes. With help of internet-based tool, stakeholders were asked to define, what sustainability themes Stora should

emphasize more and put in order of importance. The web-based tool also enabled the multi-stakeholder dialogue, gave a chance for stakeholders to contact with one another, when prioritizing sustainability themes. The feedback, which was conducted through stakeholder dialogue, forms the basis of the materiality analysis for the purpose of Stora's corporate responsibility reporting. In addition, in 2013 the web-based stakeholder dialogue continued in a more permanent formant of advisory panel discussion. The stakeholders that have participated in a dialogue receive a feedback about the results of the dialogue and the impacts to company's decision-making process. (Niskala et al. 2013).

As in Stora Enso's case regarding the stakeholder involvement strategy, Mark-Herbert and von Schantz (2007) concluded in their study, that the company's official website beside the annual reports and sustainability reports has become an important communication platform in terms of sustainability actions of the company. In addition, in recent years, companies have put more emphasis on developing long-term relationships with their stakeholders rather than focusing on a simple instance of communication and profit (Cornelissen 2011).

3.3.3. Online communication process

As previous mentioned and according to several studies, Internet has become an important public relation tool and communication channel for transmitting companies' sustainability actions to different stakeholders (Dawkins 2004, Capriotti and Moreno 2007, Wanderley et al. 2008, Hong and Rimb 2010, Gomez and Chalmeta 2011), since it allows companies to disclose more information less expensively and faster than other communication channels (e.g. newspapers, magazines, brochures, campaigns, television, radio) (Wanderley et al. 2008). In addition, the detailed up-to-date information on the web remains available for the large audience and hence, the various users of Internet are able to select which information is relevant for them (Wanderley et al. 2008). As a result, an effective and creative strategic plan including content of sustainability messages, web design and interactive features for a corporate website, is required to communicate on sustainability issues through Internet. (Honga and Rimb 2010, Gomez and Chalmeta 2011).

The descriptive and informative approach, including the general attributes of a company and of its products and/or services, as well as commercial perspective have been the most common functions of corporate websites. In addition, the legislation imposes companies to present for instance business identity code (FINLEX 2014) or such information on their websites. As for sustainability online communication, the economic aspect of the "triple bottom line"-model does not have as much weight in the company's web-based communication as social and environmental sustainability aspects. (Capriotti and Moreno 2007). As previously disclosed, forest industry companies are mainly focusing on environmental aspect of corporate responsibility in terms of greenness in their sustainability-related online communication. Moreover, the official corporate website contains several pages, each addressed to different stakeholder group (Esrock and Leichty 2000) e.g. customer pages and pages for employees and other internal stakeholders (intranet) are separated.

The online communication includes different features, such as electronic documents, multimedia applications, social media, search tools and blogs. For instance, social media and web-based discussion forums allows a company to have a dialogue with its various stakeholders and simultaneously obtain feedback from them (Branco and Rodrigues 2006, Niskala et al. 2013). However, according to findings of Gomez and Chalmeta (2011), Capriotti and Moreno (2007) and Dawkins (2004), the communication can be seen as a missing link in company's sustainability practices in terms of developing online communication more interactive way. Companies are mainly focusing on presenting the content of information and visual aspects rather than enhancing dialogue with different stakeholders (Capriotti and Moreno 2007). As Gomez and Chalmeta (2011) note, both social media channels such as Facebook, Youtube, Linkedin, Twitter and blogs, and web-based platforms will provide opportunities for companies to involve stakeholders in their sustainability practices.

The key findings of the CSR Online Awards Survey 2010 by Lundquist (2010), reinforce the fact that stakeholders require a real-time relationship and dialogue with the company for instance in social media. Most of the stakeholders found corporate websites to be the most important source of information including CSR information and almost a third of them think that they will find more up-to-date information from

websites than from reports. Even though, social media has become more popular and common channel for stakeholders to contact the company and give a feedback to them, e-mail is still the most common channel for engagement and feedback (Figure 8). However, most of non-corporate stakeholders (54%) wish for companies to answer stakeholders' questions by using social media. (Lundquist 2010).

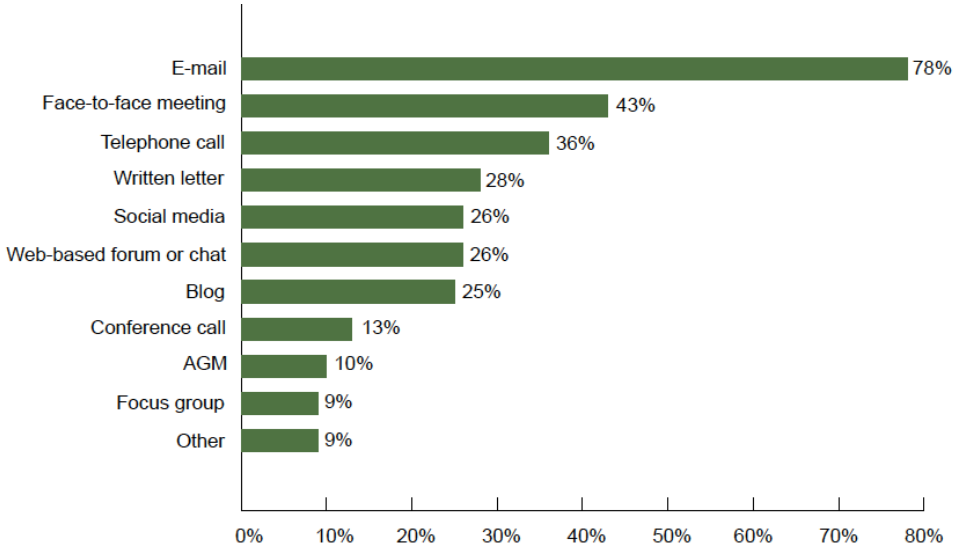


Figure 8. Feedback and engagement channel (% of 70 non-corporate stakeholders who have given feedback to companies). Source: Lundquist (2010).

When it comes to stakeholders' need for information of company's CSR actions, the content of corporate websites becomes important for the company to discover. According to Lundquist (2010), the relevant data and targets of environmental issues as well as climate change strategy and environmental management system are the most preferred information on the environmental front from a stakeholder point of view. In addition, stakeholders require information about employee data, supply-chain management, human resources or diversity policies and the code of ethics from the social aspect.

The CSR Online Awards Survey 2011 examined, how to build trust in online audiences in terms of company's commitment to responsibility and sustainability actions. The key finding to bring credibility when applying CSR information online is for the company to harness international principles and guidelines (i.e. Global Compact Initiative), to publish performance data and to have external assurance and partnership with NGO's. (Lundquist 2011).

3.4. Frame of analysis

The framework of this study suggest that through mutual dialogue (*two-way symmetric communication*) the company should involve its stakeholders into the decision-making process regarding company's sustainability issues. The stakeholder dialogue and the key sustainability themes of the company are described in the Figure 9, which illustrates the framework of this study. These sustainability themes emerged from web-based communication are based on the "triple-bottom line" - model by Elkington (1997). The model of stakeholder orientation in forest products industry was modified from figures regarding stakeholder interests towards company's sustainability operations (Niskala et al. 2013) and stakeholders-system of the forest-based sector (Woodk K Plus 2013) to meet the purposes of this study.

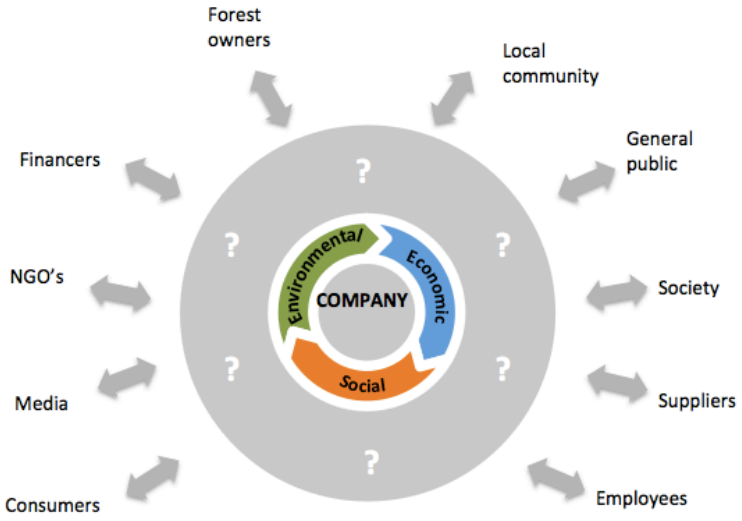


Figure 9. Stakeholder orientation in a frame of sustainability-related communication in forest products industry adapted from Niskala et al. (2013) and Wood K Plus (2013).

As illustrated in the figure above, the forest company or an association determines which *sustainability themes* (**research question 1)** from the three different sustainability dimensions (*economic, environmental and social*) are relevant for their business strategy (Johnson and Walck 2004, Li and Toppinen 2011). These dimensions will constitute the frame and main categories for the inductive content analysis. The stress of individual themes emerged from the websites of forest

companies and associations indicates the current state of sustainability-related online communication in wood product industry. Nevertheless, the situation is not that one-sided, as from the social impact point of view (Li and Toppinen 2011) stakeholder groups have their own role in the decision making process through their needs and expectations on companies' and associations' sustainability activities (**research question 2**). The topical sustainability issues identified by European stakeholder process forms a category pattern for the deductive research. This complements the findings from inductive analysis, and thus confirms the current state of sustainability communication within the forest products industry.

The following stakeholder groups *consumers, NGO's, media, financers, forest owners, general public, society, suppliers and employees* are disclosed as the key stakeholders of the forest companies based on previous literature (Papasolomou-Doukakis et al. 2005, Longo et al. 2005, Panwar et al. 2006, Morsing and Schultz 2006, Mark-Herbert and von Schantz 2007, Niskala et al. 2013, Wood K Plus 2013). These various stakeholder groups have their own different expectations, opinions and demands towards company's or association's actions that the company or association must take into consideration in planning the content of communication and in targeting sustainability messages to various stakeholder groups (**research question 3**). The direction of communication (one-way, two-way asymmetrical or two-way symmetrical) and the intensity of communication (i.e. how much and how often) describe the state of stakeholder involvement in organizations sustainability communication. In other words, this study aims to find out if the messages of sustainability issues are only informative or does the company involve its stakeholders in the discussion of the company's sustainability issues (**research question 3**)?

Based on Cornelissen's (2011) and Morsing and Schultz (2006) description of stakeholder communication strategies the corporate official websites function as a one-way information source to stakeholders whereas various social media channels play a part in the dialogue strategy. The online communication by using corporate official websites as a platform for sustainability messages and as a channel to reach various stakeholder groups can be complemented with the different channels of social media to enhance the interactivity of stakeholders.

4. Research methodology and data

4.1. Qualitative research based on content analysis

In this study, sustainability-related online communication on the companies' and associations' websites in Finnish wood products industry were identified and reviewed by using qualitative content analysis by Krippendorff (1989) in inductive and deductive ways. Along with identifying sustainability topics, the state of stakeholder orientation and the nature of communication (one-way, two way asymmetric or two-way symmetric communication) were determined based on examination of online communication. In general, the qualitative research approach is based on the way of understanding the world, in this case a research phenomenon, and examining the truth and knowledge (Helkkula 2014).

According to Krippendorff (1980) and Cavanagh (1997), the content analysis has been seen as a one of the most significant and flexible research techniques and scientific tool in the social science. The content analysis method views data in text or image format, and it can be described as a research method for making repeatable and valid conclusions from data related to their context (Krippendorff 1980). The text or visual image data can be obtained in print, verbal or electronic form by analyzing the content of such as documents, reports, articles, books, manuals, tables, photographs, interviews, open-ended survey questions and website pages. In addition to qualitative method, content analysis may focus on quantitative aspects depending on the preferences of researcher, results desired, length and type of the material as well as technological capabilities. (Kondracki et al. 2002, Elo and Kyngäs 2008).

As already mentioned in the case of qualitative research, the content analysis as an analysis method provides new insights and knowledge, creates understanding of the phenomenon under research and informs of practical actions related to the research phenomenon. The data describes the phenomenon. The purpose of the data analysis is to create a clear description of the phenomenon as well as to organize the data in a compact and clear form without losing the information included. (Hämäläinen 1987, Strauss and Cobin 2008, Elo and Kyngäs 2008). In addition to aforesaid matters,

Kondracki et al. (2002) pointed out a few strengths that a content analysis includes compared to other types of research methodologies. These strengths are cost-effectiveness, abilities to use data from the past and track changes in messages over time. However, after paying the expenses originate from equipment and programs used, techniques, size of the research and personnel costs, the follow-up studies related to the research or areas researched in the future are inexpensive. At the same time, the content analysis has been criticized for being too flexible and simple leading to the fact that, there is no one right way of conducting it (Elo and Kyngäs 2008).

As mentioned before, content analysis can be implemented by using either qualitative or quantitative method or both. The quantitative method focuses only on examining the manifest (surface level in the text) content of data by recording and counting the key words in frequencies. On the contrary, the qualitative content analysis interprets the latent (deeper understanding of the text) content of data. (Kondracki et al. 2002, Graneheim and Lundman 2003, Schreier 2012). Nevertheless, according to Berelson (1952), manifest meaning can be considered as clear, simple, direct and a meaning of which different observers are likely to agree while latent meaning is opaque and probable to be different for different audience. Instead of choosing either manifest or latent content analysis strategies, Berg (2009) suggests blending them will get the best resolution of content analysis. To emphasize the magnitude of operation, researcher may report frequencies. However, researcher has to remember not to take significances as findings themselves. The differences between qualitative and quantitative content analysis are illustrated in the Table 5.

Table 5. Qualitative content analysis versus Qualitative content analysis (Schreier 2012).

Quantitative content analysis	Qualitative content analysis
Focus on manifest meaning	Focus on latent meaning
Little context needed	Much context needed
Strict handling of reliability	Variable handling of reliability
Reliability checks more important than validity checks	Validity checks just as important as reliability checks
At least partly concept-driven	At least partly data-driven
Fewer inferences to context, author, recipients	More inferences to context, author, recipients
Strict sequence of steps	More variability in carrying out the steps

According to Tuomi and Sarajärvi (2009), the content analysis can be extended after classifying categories to the quantification of data. In that case, the problem seems to be that the quantification does not necessarily bring more information or a different perspective on the results due to the small size of sample on qualitative analysis. In some cases, the quantification of data turns out to be beneficial by providing significant additional information compared to just quality description. In this study, in addition to qualitative approach, the quantification of results may bring more perspective and understanding about sustainability issues that are more emphasized in forest sector or within different segments – large companies, family businesses, associations and bioenergy producers – of forest products industry.

This study utilizes both inductive and deductive way of making qualitative content analysis. With an inductive approach, the researcher moves from specific to general by examining the messages of sample without conceiving themes beforehand (Kondracki et al. 2002, Elo and Kyngäs 2008). The idea behind this approach is to find key themes related to sustainability issues emerging from the text. In contrary, the deductive approach with given topics, in this case with predestined sustainability themes defined by European stakeholder process (Helsinki 22.9.2014), moves from general to specific. The deductive qualitative content analysis is also carried out with the chosen category pattern and by using the same coding logic in three forestry-rich European countries including Slovenia, Germany and Austria as a part of the international research project 'W3B: Societal perceptions of forest sector on sustainability'.

The findings from different approaches can be compared, and through that it is possible to receive a new information about what sustainability issues a company thinks are relevant for stakeholders as well as what sustainability issues relevant for stakeholders emerges from the company's online communication.

4.2. Validity and reliability

Compared to quantitative research, qualitative content analysis is more complex and confusing since there are no formulas or standards for data analysis (Elo and Kyngäs 2008) and no straightforward tests for validity and reliability to apply (Patton 2002). In addition, each qualitative inquiry is unique, and the analysis depends on several factors, such as on skills, analytic abilities of the inquirer, insights and style of the researcher (Patton 2002) that may be a challenge in promoting objectivity in research to minimize bias.

Reliability in qualitative research refers mainly to the state of *consistency* regardless of whether the research is made by different observers or by the same observer on different occasions (Silverman 2000 and Schreier 2012). In content analysis, reliability is a criterion often used in evaluating the qualitative of an instrument, such as a coding frame or a questionnaire. As in qualitative research in general, the instrument is ascertained to be reliable to the extent that data and findings are free of error. In other words, the coding remains consistent through an entire coding process. To avoid using categories inconsistently, the units of analysis will be coded consistently with using the same coding logic. Identifying and assessing error in quantitative content analysis differs from qualitative analysis. (Schreier 2012).

In quantitative research there are three types of reliability to be maintained: stability, reproducibility and accuracy. Stability, also known as intracoder reliability, should be determined by having the same coder recode a subset of the data sample to ensure that the coder has not changed their coding decisions or coding logic over the time. Reproducibility or "intercoder reliability", can be achieved when more than one coder will reach the same conclusion. *Accuracy* is the strongest form of reliability and it describes the quality of content classification. (Weber 1990, Kondracki et al., 2002). To sum up, according to Schreier (2012), it is important to ensure for

consistency between different coders or points in time to assess the reliability of the coding frame.

Validity, in general, means truth, the extent to which conclusion or a measurement of the research corresponds accurately to the social phenomenon to which it refers (Silverman 2000). Schreier (2012) also describes validity in qualitative research as overall quality of the study and an extent to which the selected instrument measures what it sets out to measure. Validity standards and criteria in qualitative research are challenging to establish due to the necessity to encompass rigor and subjectivity as well as creativity into the research process.

In qualitative research the concept of validity has been differentiated to primary criteria; including credibility, authenticity, criticality, and integrity; and to secondary criteria, including explicitness, vividness, creativity, thoroughness, congruence, and sensitivity. (Whittemore et al. 2001). *Credibility* covers the focus of the research and refers to the certainty in what extent data and process of analysis address the intended focus. In addition, it is necessary for the credibility and purpose of the study that researcher chooses a suitable sample and data selection method for the research. A representative amount of data provides useful information and that is why the most suitable coding unit for the content analysis is for instance several paragraphs instead of a single word. (Whittemore et al. 2001, Graneheim et al., 2003). *Authenticity*, which is closely linked to creditability, involves interpretation of the study that influences the meanings perceived by the observer, whether the meaning is manifest or latent (Schreier 2012). *Critical analysis*, open inquiry and reflexivity contribute to the validity of the study. Obscurity should be studied and recognized, and to review findings a variety of suitable methods are proposed to be useful to utilize. Evidence should be justified by the researchers' interpretations to avoid distortion or conjecture. *Integrity* is evidence in the qualitative research process to ensure that the interpretations are valid and based on data. Ideally, through substantiated and responsible scientific process knowledge assertion made by researcher demonstrates criticality and integrity. (Whittemore et al. 2001). The coding frame can be considered as valid to the extent that decided categories appropriately represent the concepts in the research questions. In order to achieve this, the coding frame has to be adapted so as it fits in the material. (Schreier 2012).

4.3. The sample

Qualitative research is typically utilizing purposively selected small non-probability samples to emerge population for the study. The non-probability and "adapted to its purpose" in sampling refers to the same ideology in selecting representative population for the research. The logic behind both views lies in choosing deliberately information-rich cases also known as *sample units* reflecting particular features for study in-depth. (Ritchie and Lewis 2003, Patton 2002). In the purposive sampling the researcher chooses a sample to represent the population by using special a priori knowledge in sampling (Berg 2009).

In this research, the population consists of Finnish wood products industry companies and associations identified and divided in four segments: large companies (3), family business companies (15), associations (5) and bioenergy producers (5). In total the sample size is 23 without bioenergy producers (see Table 6). Unlike other segments, companies in the segment of bioenergy producers overlap with companies from the other segments and hence they are double-counted in the sample. This is explained by the fact that forest companies may operate in several industry branches (e.g. pulp and paper and / or bioenergy) along with the wood products industry. In addition, it must be taken into account that some of the companies operate on both the national and the international level (i.e. Stora Enso and UPM) or just on the national level (i.e. Kuhmo and Koskisen). This division is based on the location of a company's business units, not on the sales distribution networks. Moreover, Forest Speaks –project is upheld by Finnish Forest Association, and they both are separately under review in the study.

Wood products industry, in this research, has been limited to sawmill, wood panel and wood construction industry. In addition to online-based analysis of forest associations, sustainability themes emerged from responsibility brochure *Responsibility at the heart of developing bio-economy* of Finnish Forest Industries Federation were identified and evaluated by using inductive and deductive qualitative content analysis to complement the research. The companies and associations that were examined in the study are presented in Table 6.

Table 6. Sample and background information of organizations, sources: Honka Log Houses 2013, Stora Enso 2013,UPM 2013, Metsä Group 2013, Kauppalehti 2014, Keitele Forest 2014, Statistics Finland 2014, Vapo 2014, Versowood 2014, Westas 2014.

SAMPLE		
Companies/ associations	**Sales in 2013 (million €)**	**Industry sector**
Large companies:		
Stora Enso	10 600	Paper, biomaterials, wood products and packaging
Metsä Group	4 900	Tissue, board, pulp, wood products and forestry services
UPM-Kymmene	10 100	Pulp, paper, biorefining, energy and wood products
Family businesses:		
Luvia wood	69	Sawmilling and planing of wood
Junnikkala	68	Sawmilling and planing of wood
Keitele group	133	Sawmilling and planing of wood
Koskisen	188	Plywood and laminboard
Kotkamills	275	Paper and paperboard
Kuhmo	83	Sawmilling and planing of wood
Isojoen saha	34	Sawmilling and planing of wood; Energy
Pölkky	153	Sawmilling and planing of wood
Vapo	617	Sawmilling and planing of wood; Peat extraction
Veljekset Vaara	14	Sawmilling and planing of wood
Westas	90	Sawmilling and planing of wood; Other chemical products
Versowood	278	Other builders' carpentry and joinery; Energy
Siparila	19	Sawmilling and planing of wood
Kuusamon Log Houses	14	Prefabricated wooden buildings
Honka Log Houses	48	Prefabricated wooden buildings
Associations:		
Finnish Sawmill Association		Focus on sawmilling
Finnish Forest Association		Focus on forest sector
Forest Speaks- project		Focus on young and education
Finnish Forest Industries Federation		Focus on forest industry
Finnish Forest Industries: Responsibility at the heart of developing the bio-economy (brochure)		Focus on bioeconomy
Bioenergy producers:		
UPM-Kymmene	10 100	Pulp, paper, biorefining, energy and wood products
Vapo	617	Sawmilling and planing of wood; Peat extraction
Versowood	278	Other builders' carpentry and joinery; Energy
Isojoen saha	34	Sawmilling and planing of wood; Energy
Westas	90	Sawmilling and planing of wood; Other chemical products

According to Ritchie and Lewis (2003), this research followed two aims of the purposive sampling method in a sampling process. First, researcher has to ensure by using selection criterion that all relevant groups from the population are covered. For the purpose of the research it is necessary to investigate sustainability themes

through categorizing companies and organizations into segments to explore disparity between segments while examining the results. Segmentation also ensured that relevant groups in wood products industry are included in analysis. Second, it is important to ensure that some diversity within each segment is included to disengage impacts of the segment's feature and other factors involved. Each segment contains a comprehensive range of representatives, which fulfill the criteria of a segment and cover the characteristics of a population.

In addition to above-mentioned criteria, companies and associations are selected for this study based on the coverage of their websites in terms of sustainability matters. Since the amount of content on websites varies depending on the size and internationality of the company, the number of companies and associations in segments is uneven to balance this.

4.4. Data analysis process

A theoretical perspective involves both inductive and deductive approach of qualitative content analysis. The deductive approach provides means by categorizing data based on theoretical perspective while the inductive approach develops theory from phenomenon based on the grounded theory (Strauss 1987, Berg 2009). Margrit Schreier (2012) describes qualitative content analysis as "a method for systematically describing the meaning of qualitative material" by categorizing the data.

Data in the data analysis is derived from the content analysis of wood products industry companies' and associations' online communication. The data was collected from 23 official corporate websites into various text files during June and July 2014. Instead of pictures, reports in PDF-form, job advertisement and news older more than 6 months, all text and tables from the webpages were encompassed in the data file. Graneheim et al. (2003) point out, when using content analysis as an analysis method the most important decision is to select the unit of analysis. In this study, the unit of analysis is corporate websites in text format. The researcher conducted qualitative content analysis in inductive and deductive way by using Atlas.ti-software.

Process of analysis and coding. There are several suggested patterns concerning the steps of qualitative content analysis (see Elo and Kyngäs, 2008, Schreier 2012). According to Elo and Kyngäs (2008), both inductive and deductive content analysis include three phases: preparation, organizing and reporting. Schreier (2012), however, extends it to involve deciding on a research question, selecting the material, building a coding frame, dividing the material into units of coding, trying out the coding frame, the main analysis as well as interpreting and presenting the findings. Before selecting the coding unit along with themes (categories) and sub-categories, the researcher has to specify the aspects – main categories of the coding frame – on which should be focused on.

Step 1. Data preparation: selecting the coding unit

When using a content analysis it has to be decided what unit of analysis will be counted as a coding unit, which can be words, sentences, sections or paragraphs (Berg 2009). As mentioned before, for the creditability it is important to select suitable coding unit to maintain the context of a text during the condensation and abstraction process. For instance, a single word or even a sentence can be too narrow to be a coding unit whereas several paragraphs can be difficult to manage as they may contain several meanings (Graneheim et al. 2003).

Step 2. Organizing data: developing categories and a coding frame

In the second phase, after the researcher has chosen which inductive or deductive approach to use in the content analysis, the researcher focuses on organizing qualitative data. In **inductive content analysis** the process encompasses open coding, creating categories and abstraction process.

Open coding means that a researcher marks keywords in the margin to describe all the aspects of the content while reading through each transcript carefully (Hsieh & Shannon, 2005; Berg, 2009). *Creating and defining categories* is a central concern of inductive content analysis and it includes determining themes or groups of content that shares a commonality (Krippendorff 1980). The specifications serve as categories (themes) and sub-categories are grounded from the main categories of the coding frame, which is a way of structuring data (Schreier 2012). The main purpose of categories is to provide means of depicting the phenomenon under the research, to

generate knowledge and to raise understanding. To accomplish this, researcher can use many sources of information to reinforce the categorization, for instance to use relevant theory or run a background research. Often there will be occasions when collected data includes several meanings and by taking this into account, the researcher must determine the best way of categorize the data. In determining the detail of categories a consistent and clear approach will ease the coding process (Cavanagh 1997). The last step of organizing data, *abstraction*, formulates the general description of the study topic through creating categories. Each sub-category with similar features or topics is grouped under the same category or a main category (Elo and Kyngäs 2008). When all categories have been generated and defined, it is time to revise the coding frame, intending to go through main categories, categories and sub-categories again in structural terms. This is time to make improvements and to correct substantial overlaps between categories. All previous steps needs to be repeated as many times as there are new sets of material, until the coding frame covers the total variation in the data. In **deductive content analysis** a concept-driven way means working by categories of the coding frame and sub-categories that are based on e.g. previous literature or existing theory, prior research or logic. (Schreier 2012). Thus open coding and testing the coding frame is not valid in this situation.

Step 3. Reporting findings

In order to provide clear understanding for readers on analysis process, the results and analysis process needs to be described in sufficient detail in following sections. This also requires dissection of the validity of results and analysis. The findings should be analyzed through contents of categories and reflected the subject of the research in a reliable manner. (Kyngäs and Vanhanen 1999, Elo and Kyngäs 2008).

Checking coding logic and frequency count of this study. In both inductive and deductive content analysis, the coding unit consists of either several sentences, a section or a paragraph depending on the context. Quotations tagged with a code were predominantly comprised of sections, which are separated from each other with a section break. Eventually, the length of coded quote has no great significance to the results due to the frequency counts were based on number of quotation. The codes – *sub-categories* – were grouped into code families – *themes* or *TOIs* – and quotes tagged with a certain code or various codes were counted once in a code family.

Unlike in inductive analysis, where the same coding unit might contain several codes from one code family, in deductive analysis only one code from the code family can be chosen. The reason for that is to make the coding and results in deductive research comparable with other countries of the research project and to avoid the risk of double coding quotes under the equivalent code family. However, by using Atlas.ti – software the program systematically counts quotes only once in a code family making the double coding for codes within a same code family impossible.

Depending on the analysis method, the data set consists of a frequency count of 4205 observations in inductive and 2716 in deductive analysis. The volume of the data can be divided by organizational segments and by pre-selected themes or topics of interests (TOIs). In the section of results, the frequency counting observations are presented in breakdown to percentages in tables or pie charts by calculating percentage that each theme or TOI contributed to the total of the whole sample as shown in Table 7 and Figure 13. To reach the segment specific results concerning each theme, first calculated the total overall themes within a segment and then divided each frequency of a theme or TOI by the total frequency count of the segment and converted the decimal into a percent (Figures 10, 11, 12 and 14).

5. Results and discussion

5.1. Inductive content analysis: sustainability themes emerging from the data

5.1.1. Distribution of observations into sustainability dimensions

The first main target of the study was to examine the current state of sustainability-related online communication in Finnish wood products industry through inductive content analysis (**research question 1**). In total, the data set consist of a count of 4205 observations regarding emerging sustainability themes from the data. The themes emerged from the data were divided into three main categories based on the" triple-bottom line" -model (Elkington 1997). In general, regardless of whether large companies, family businesses, associations or bioenergy producers are in question, the main emphasize of sustainability-related online communication is by 45% on environmental issues. The share of social, 36%, and economic, 19%, sustainability-related communication is lesser but not less significant. This is not unexpected based on previous studies (Brearton et al. 2005, Kärnä et al. 2003, Vidal and Kozak 2008a,b, Han et al. 2013) as forest industry has among other environmentally-sensitive industries a crucial role in preventing global climate change by relying on the use of renewable and recyclable wood as its raw material.

The Table 7 illustrates the final distribution of sustainability themes (n=17) in the whole sample. The highest number of observations from sustainability-related communication was categorized in following themes: *Financial operations and arrangements* (FOA, 13%), *Stakeholder engagement* (SEN, 12%), *Material sustainability* (MSU, 11%), *Environmental impacts* (EIM, 10%), *Environmental protection and biodiversity conservation* (EPB, 8%), *Biobased products and bioeconomy* (BPB, 7%), *Standards* (STA, 7%) as well as *Law, legislation and regulations* (LLR, 7%). The lowest frequency of hits were received by *Human and labor rights* (HLR, 1%), *Water efficiency and management* (WEM, 2%), *Employee development* (EDE, 3%), *Employment* (EMP, 3%) as well as *Health, safety and well-being of employees* (HSW, 3%). These themes are narrower in scope, which may be the reason for the results obtained.

These findings correspond partly with the results of Vidal and Kozak (2008a) concerning more frequently used CSR activities by forest companies in their CSR/ sustainability reports. The most covered sustainability topics in the research of Vidal and Kozak were sustainable forest management, accountability (i.e. regulation, policies and ethics), employment, recycling, certification, community development, air and safety. Similarities can be discovered considerably by comparing the content of the most reported CSR topics by Vidal and Kozak (2008a) to the top eight sustainability themes emerged from this study.

Table 7. Distribution of emerged sustainability themes (n=17) in total data (n=23)

Main categories	Themes	Acronym	%
Economic	Financial operations and arrangements	FOA	13
Social	Stakeholder engagement	SEN	12
Environmental	Material sustainability	MSU	11
Environmental	Environmental impacts	EIM	10
Environmental	Environmental protection and biodiversity conservation	EPB	8
Environmental	Biobased products and bioeconomy	BPB	7
Social	Law, legislation and regulations	LLR	7
Social	Standards	STA	7
Environmental	Energy efficiency and management	EEM	4
Environmental	Material efficiency and reducing waste load	MER	4
Economic	Competitiveness	COM	4
Social	Employee development	EDE	3
Social	Employment	EMP	3
Social	Health, safety and wellbeing of employees	HSW	3
Environmental	Water efficiency and management	WEM	2
Economic	Risk management	RMA	2
Social	Human and labor rights	HLR	1

According to Vidal and Kozak (2008a), the sustainability reporting in Europe is mostly focusing on environmental issues whereas the findings of this study show that the social aspect has increasingly taken a root in sustainability-related communication especially by involving and engaging stakeholder in company's business and sustainability activities. Also as Panwar et al. (2006), Vidal and Kozak (2008b) and Han et al. (2013) discovered, forest industry has put more emphasis in its social responsibilities and in its stakeholder needs and interests.

According to Trade Register (2014), public limited companies and limited liability companies in Finland must submit their financial statements to Finnish Patent and

Registration Office for public access. Thus, it is quite probable for a company to share its financial information on its official website to advance the transparency of the company's financial operations in the eyes of its stakeholders. In addition to wide range of sub-categories such as sales, revenue, donations, sponsorships and earnings from economic sustainability (see Table 10) explains the high frequency of hits of *Financial operations and arrangements (FOA)* received from the analysis. Therefore it is not relevant to put a great emphasis on FOA in analyzing the results.

Table 8. Segment specific results in general, mean frequency of sustainability topics.

Main categories	Themes	Large companies (mean f)	Family businesses (mean f)	Associations (mean f)	Bioenergy (mean f)
ENV	EIM	67,67	3,00	9,80	26,40
	EPB	47,00	4,13	10,20	18,00
	BPB	32,67	2,60	8,80	19,80
	EEM	23,67	1,13	3,00	9,60
	MER	23,00	2,40	2,00	13,20
	MSU	70,00	4,40	11,60	26,40
	WEM	13,33	0,33	0,80	5,40
ECO	COM	20,67	0,87	6,60	8,00
	FOA	76,33	7,20	7,40	33,40
	RMA	17,33	0,80	0,00	6,00
SOC	EDE	18,67	1,47	1,20	6,40
	EMP	12,33	2,00	5,60	5,80
	HSW	20,00	0,80	1,20	6,40
	HLR	13,67	0,27	0,40	2,60
	LLR	42,33	3,13	6,80	15,80
	SEN	74,67	5,33	11,60	27,40
	STA	44,00	4,73	1,40	17,80

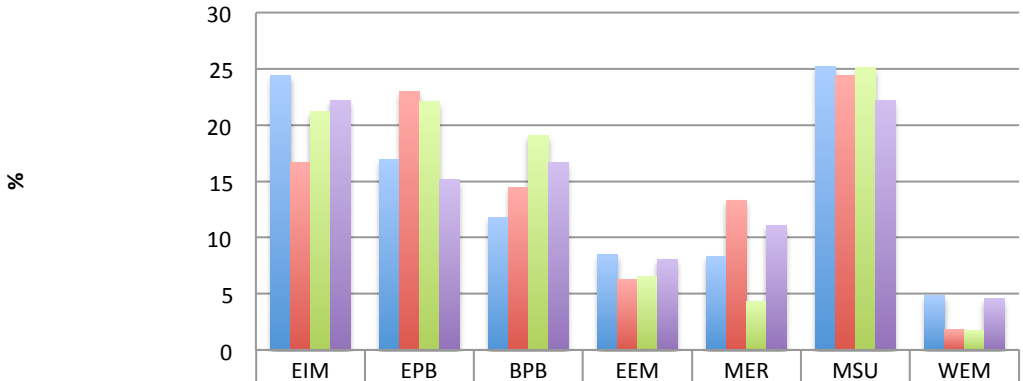
Priorities in sustainability communication of family businesses and bioenergy producers varies from the general results when examining the segment specific results of five most covered themes in each segment (see Table 8). In addition to *Financial operations and arrangements* (FOA, mean f= 7.20), *Stakeholder engagement* (SEN, mean f= 5.33) and *Material sustainability* (MSU, mean f= 4.40), *Standards* (STA) including ecolabels and certifications is the third most communicated sustainable theme within family businesses since contents relating to the theme were mentioned 4.73 times on average on a company website. For bioenergy producers, *Biobased products and bioeconomy* (BPB, mean f= 19.80) is frequently communicated topic along with FOA, EIM, MSU and SEN (Table 8).

In the following subsections, the themes are reviewed in more detail in general and segment specifically through main categories (environmental, economic and social sustainability). Themes have been proportioned to the occurrence of other themes within the same main category. These percentage distributions of sustainability themes have been depicted in Tables 9, 10 and 11.

5.1.2. Environmental sustainability

Within the main category of environmental sustainability, *Material sustainability* (MSU, 24%) was the most commonly covered theme based on corporate and association websites. All quotes in which appeared the adjectives such as environmentally friendly, recyclable, renewable, sustainable and ecological to describe the sustainability of wood in general were placed under the category of MSU. Overall regarding segments specific results MSU was the most covered topic under environmental sustainability (Figure 10). Nevertheless, some minor differences between segments can be noted. For the segment of large companies and bioenergy producers, *Environmental impacts* (EIM), which mainly focus on companies reducing CO_2 emissions in their production processes e.g. by using carbon free fuels and disclosing the carbon sequestration in wood, were highly emphasized in their online communication as the following quotation by Vapo from the segment of bioenergy producers illustrates:

> "Our aim is to reduce greenhouse gas emissions
> We replace fossil fuels - oil and coal - with local fuels and energy solutions. Our objective is to rapidly turn bogs released from production into carbon sinks. We aim to improve energy efficiency in everything we do, reduce greenhouse gas emissions from transport and analyze the carbon footprint of our products." (Vapo, 18.5.2014)



	EIM	EPB	BPB	EEM	MER	MSU	WEM
Large companies	24	17	12	9	8	25	5
Family businesses	17	23	14	6	13	24	2
Associations	21	22	19	6	4	25	2
Bioenergy producers	22	15	17	8	11	22	5

Figure 10. Segment specific results of environmental sustainability, in %.

As Draper (2006) note, forest industry improves its competitiveness and its market positioning against plastic or concrete industry by reducing emissions and replacing fossil fuels to prevent a climate change. Along with reducing emissions to air, impacts on soil, waterways and biodiversity play an essential role in environmental sustainability. Instead, *Environmental protection and biodiversity conservation* (EPB) appears to be an environmental topic more often communicated by family businesses and associations in relation to the distribution of environmental themes of other segments. Companies and associations show support for sustainable forestry by adapting forest certification schemes and sustainable forestry management practices and communicating these issues to stakeholders. The majority of family business companies are specialized in sawmilling and planing of wood, which pertain to the primarily stage of wood products industry value chain (see Chapter 1.1: Figure 2). The direct linkage with forests explains the notable share of EPB in environmental-based sustainability communication of family businesses in terms of reporting their sustainable forest management practices (e.g. preventing illegal logging, participating in environmental projects and increasing volume of decaying trees) on their websites (see EPB from Figure 10 and Table 9). From associations' viewpoint, the following quotation gets to the heart of the matter when the Finnish Forest Association describes how they aim to promote the acceptance of a responsible use of forests:

> "The Finnish Forest Association is an organisation for the co-operation of its members and stakeholder groups; its main activity is communication. The Association's aim is to provide information on the potential of forests in solving societal problems and to promote the acceptance of a responsible use of forests." (Finnish Forest Association, 10.5.2014)

Additionally, a following quotation of the Finnish Forest Industries Federation reinforces an argument on behalf of associations as contributors to sustainable forestry and environmental protection:

> "The Finnish Forest Industries Federation supports the adoption of impartial and broadly recognised international certification systems. Forest certification can help safeguard the foundations of sustainable forest utilisation and supports international comparability." (The Finnish Forest Industries Federation, 16.5.2014)

The finding is not entirely congruent with findings of Vidal and Kozak (2008a) who discovered that the sustainable forest management including forest and biodiversity conservation, habitat, wildlife and sustainability was the most reported sustainability feature on sustainability reports of large forest companies. However, sustainable forestry and biodiversity aspects are the third most mentioned environmental topics on large companies' websites based on the findings of this study (see EPB in Figure 10).

The forest sector has a significant role in debate of climate change and bioeconomy since the forest sector produces sustainable and renewable wood-based material, which is industrially refined into biomaterials such as wood-derived biofuels, biopolymers, biochemicals and composites to replace fossil-based alternatives (Finnish Forest Industries 2013b). *Biobased products and bioeconomy* (BPB) was covered in relations to other environmental themes within large companies by 12%, family businesses by 14%, associations by 19% and bioenergy producers by 17%. As a contrary to expectations, the theme of BPB was only the third most mentioned environmental theme (see Figure 10) within the segment of bioenergy producers and fourth most covered sustainability topic in general (see Chapter 5.1.1: Table 8). According to mean frequency distribution of BPB, the segment of large companies covered features in bioproducts and bioeconomy in their sustainability-related communication 32,67 times on average, which is 65% more than bioenergy producers (see Table 8) since they all, Stora Enso, UPM and Metsä Group, have smattering operations and new innovations related to bieconomy.

Based on the information that large companies share on their website, Stora Enso Biomaterials (2015) utilizes its renewable and non-food competing feedstock to develop a range of intermediates that can substitute non-renewable chemicals and materials such as micro cellulose (MC), lignin-based products, biochemical and biofuels. UPM-Kymmene (2015), also a member of bioenergy producer segment, leads the integration of bio and forest industries into a new, sustainable and innovation-driven biofore industry by manufacturing biomass-based combine heat and power along with biocomposites, biochemical and biofuels. As for Metsä Group (2015), they have planned a bioproduct mill, which ought to be the forest industry's largest investment ever in Finland. In addition to high-quality pulp, they will produce a variety of different bioproducts such as pine oil, bioenergy and wood fuel.

As mentioned in previous chapter, the reason why *Material efficiency and reducing waste load* (MER, 9%), *Energy Efficiency and management* (EEM, 8%) and *Water efficiency and management* (WEM, 4%) received the lowest frequency of hits within the main category of environmental sustainability result most likely from the narrow scope of themes (Table 9). These themes focus on a specific section of company's sustainability actions such as on material, energy and water efficiency, whereas themes with the highest number of observations are thematically wider and thus more comprehensive. In contrast, recycling, energy and water were listed among the top eleven of twenty-three CSR activities by top forest companies in the research of Vidal and Kozak (2008a).

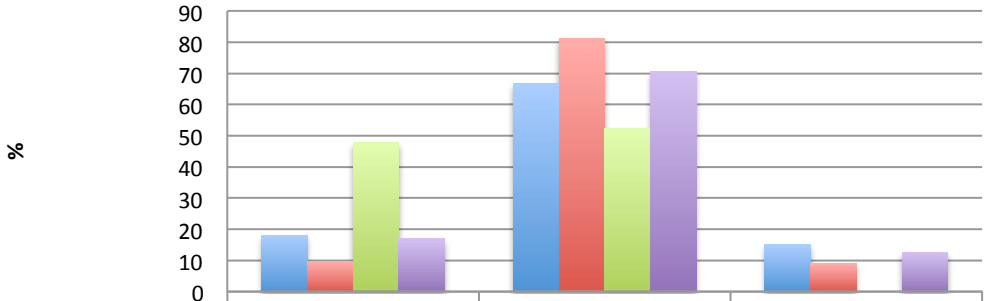
Table 9. Summarizing environmental themes and sub-categories.

Environmental themes	%	Sub-categories
Environmental impacts (EIM)	22	Climate change and greenhouse effect, emissions (SO2, NOx, CO2), pollutions and toxic (COD, AOX, chlorine), dust and noise, positive carbon impacts: sink, storage, bound, environmental footprint, transportation, environmental permits and emission rights
Environmental protection and biodiversity conservation (EPB)	18	Forest certification, sustainable forest management, origin of wood, legally sourced wood, responsible use of forests, environmental projects and programs, increasing volume of decaying trees, biodiversity, forest conservation
Biobased products and bioeconomy (BPB)	15	Bioenergy, -heat and electricity
Energy efficiency and management (EEM)	8	Wood- and bioenergy, self-sufficiency in energy production, energy challenges: climate obligations and energy costs
Material efficiency and reducing waste load (MER)	9	Resource efficiency, utilizing by-products and residues, recycling and reusing wood products in the end of their life-cycle, waste management
Material sustainability (MSU)	24	Life-cycle approach, wood as an environmentally friendly, recyclable, renewable, sustainable and ecological material
Water efficiency and management (WEM)	4	Minimizing water consumption, keeping clean waterways and groundwater, water footprint, wastewater treatment from chemicals

5.1.3. Economic sustainability

Referring to the general distribution of inductive observations, *Financial operations and arrangements* (FOA) was the most frequently communicated sustainability theme, what argues against the assertion of Capriotti and Moreno (2007). They claim that economic aspect does not have as much importance in web-based sustainability communication of corporations as social and environmental actions. Companies' financial figures were discussed in Chapter 5.1.1. as a commonly shared information. Hence, economic sustainability communication predominantly composed of *Financial operations and arrangements* (FOA, 69%), which contains such as financial figures with key numbers, investments, ownership, earnings and funding (Table 10). One reason behind the high count FOA received is the large scope in comparison to the other economic sustainability themes. In addition to financial figures, companies and associations communicate their financial operations and arrangements to promote and support environmental sustainability, as a quote from the website of Finnish Forest Industries Federation confirms:

"Over the past decade, the forest industry has spent on average EUR 20 million a year on climate-friendly investments. Air quality objectives are easily achieved in industrial areas. Reducing nitrogen oxides remains a challenge. One of the forest industry's strengths is its significant bioenergy self-sufficiency. Energy conservation agreements are a part of effective environmental work." (Finnish Forest Industries Federation, 16.5.2014)



	COM	FOA	RMA
Large companies	18	67	15
Family businesses	10	81	9
Associations	48	52	0
Bioenergy	17	70	13

Figure 11. Segment specific results of economic sustainability, in %.

In reviewing segment specific results on economic sustainability, *Risk management* (RMA) was most covered topic within large companies and bioenergy producers (Figure 11). According to International Organization for Standardization (2009), the risk management process applied to an entire organization includes for instance improving the identification of opportunities and threats, effectively allocating and using resources for risk treatment, improving loss prevention and incident management and enhancing health and safety performance along with environmental protection. A large company, in this case UPM-Kymmene, implement risk management in practice in the following manner:

"The Risk Management function of UPM is responsible for:
• Communicating and enforcing the risk management policy and risk limits approved by the Board of Directors.
• Developing group-wide risk management procedures and guidelines
• Measuring and monitoring risk management performance
• Aggregating and reporting risk exposures and risk management results collected from the business groups and functions" (UPM-Kymmene, 16.6.2014)

Purportedly, large and multinational corporations need to devote into the risk management on different scale than the smaller family businesses. The majority of economic-related sustainability communication contingent on *Financial operations*

and arrangements (FOA) among all segments. FOA formed a bulk of financial communication of family businesses by 81%, since other themes COM and RMA with narrower scope remain in the background of sustainability-related communication (see Figure 11). *Risk management* (RMA) was solely communicated by companies while associations, primarily Finnish Forest Industries Federation, focused on promoting competitiveness and financial arrangements and operations such as substantial investments of Finnish forest industry.

Table 10. Summarizing economic themes and sub-categories.

Economic themes	%	Sub-categories
Competitiveness (COM)	19	Cost-efficiency, competitive advantage, competitiveness of forest sector, competitive products, competitive prices, cost-competitiveness in production
Financial operations and arrangements (FOA)	69	Sales, payments, loans, mortgages, donations and sponsorships, divests, financial position and financial figures, revenue, profitability, earnings, investments, ownership, funding
Risk management (RMA)	12	Internal control, internal auditing system, suppliers auditing process, safety requirements, risk control: employees and suppliers safety training, strategic, operational, financial and hazard risks, CSA analysis, supply chain management

5.1.4. Social sustainability

Increased attention in the concept of social sustainability among the forest industry and forest companies is a significant finding of the study. Based on the results, *Stakeholder engagement* (SEN, 33%), *Standards* (STA, 20%) and *Law, legislations and regulations* (LLR, 19%) were the most communicated topics on websites under the main category of social sustainability (Table 11) and also these themes fall in top eight (8) sustainability themes emerged from the websites in general.

Nowadays, stakeholder engagement is a significant attribute of companies' business strategy. Stakeholder engagement and partnership can be understood as trust-based collaborations between a company and its stakeholders along with practices that the company undertakes to involve stakeholders in organizational activities (Andriof and Waddock 2002, Greendwood 2007). In the segment specific results, *Stakeholder engagement* (SEN) was the most covered social theme for all segments. However, in comparison to other segments stakeholder engagement regarding co-operation, partnership and communication with stakeholders, memberships in programs and

participation in projects advancing CSR, was the most highlighted social topic within the segment of associations by 41% (Figure 12). Associations play a significant role in ensuring that the forest sector and its various stakeholders such as society, local communities, public, forest owners, institutions and consumers are continuously connected through communication and activities. Different stakeholder groups of forest products industry companies will be discussed in more detail in Chapter 5.4.2. Referring to the co-operation with stakeholders, a quote from the website of Finnish Forest Association function as an illustrative example:

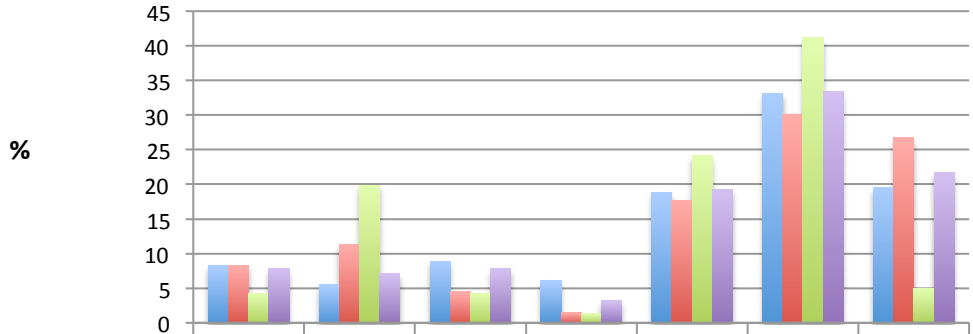
> "Co-operation with Schools
> The aim of the Association's co-operation with schools is to make sure that every inhabitant of Finland has the basic information and skills associated with occupations and business related to or based on forests and their use, as well as with forest culture and forest environment and its protection." (Finnish Forest Association, 10.5.2014)

Concerning investigated construct of stakeholder engagement and its relation with corporate responsibility, Greenwood (2007) argued against that stakeholder engagement would be precisely related to responsible treatment of stakeholders. The sanity of this argument is based on an examination of the moral status of stakeholder engagement, which points that stakeholder engagement is mainly a morally neutral activity despite it includes some moral elements. In reality, companies rather engage its stakeholders to advance its corporate objectives than out of any sense of moral commitments further support Greenwoods (2007) argument.

Standards (STA) scored the second highest frequency of hits in the segments of large companies, family businesses and bioenergy producers. According to Figure 12, STA was the most covered topic within the segment of family businesses since family businesses, especially the small ones, use often ecolabels and certifications as a reference to company's sustainability operations based on the findings. The most common and typical standards for forest products industry companies to implement are in particular FSC and PEFC forest certification systems, ISO 14001 environmental management system and OHSAS 18001 health and safety certificate, as shown below:

> "The company has been awarded the PEFC certificate from Inspecta Sertifiointi Oy and the licence to use the logo from Suomen Metsäsertifiointi ry, which guarantee that when the company harvests timber it does not endanger bio-diversity or eco-systems." (Veljekset Vaara, 20.5.2014)

An independent and qualified party, like Inspecta Sertifiointi Oy above, confirms that the company complies with the requirements of the standard. Adhesion to international principles and guidelines such as to UN Global Compact, ISO, ILO, PEFC and FSC generates the greatest confidence to stakeholders when appraising online CSR information, according to the Lundquist (2011). To achieve legitimacy, companies and associations are expect to uphold the operations, policies, mission and vision or transformation by adapting and implementing higher CSR standards when CSR standards are inconsistent with CSR preferences and stakeholder expectations (Heath and Palenchar 2011). Also, the finding of Vidal and Kozak (2008a) regarding (forest) certification (e.g. standards, PEFC, FSC, ISO) to be one of the most mentioned CSR activities among forest companies support these conclusions.



	EDE	EMP	HSW	HLR	LLR	SEN	STA
Large companies	8	5	9	6	19	33	19
Family businesses	8	11	5	2	18	30	27
Associations	4	20	4	1	24	41	5
Bioenergy	8	7	8	3	19	33	22

Figure 12. Segment specific results of social sustainability, in %.

As previously discussed, associations concentrate on informing general public and unifying essential information on current forest-related issues for different parties of the forest-based sector on their websites. Communication of industry regarding items include such as proposed changes to legislation, regulations, agreements and policies for example EU's energy and climate policies, Emissions Trading Directive and EU's timber regulation. Aforesaid can explain why *Law, legislation and regulation* (LLR)

was the second most frequently mentioned topic for the group of associations, especially in the Finnish Forest Federation, under social sustainability (Figure 12). In previous research, accountability (i.e. regulations, policies and compliance) was also highly valued CSR activity in forest companies' sustainability reports (Vidal and Kozak 2008a).

In contrast, *Employee development* (EDE, 8%), *Employment* (EMP, 8%), *Health, safety and well-being of employees* (HSW, 8%) as well as *Human and labor rights* (HLR, 4%) received the lowest frequency of hits also in general. The result would have been probably different, if these topics were placed as sub-categories under the same theme for instance under the *Employment*.

Table 11. Summarizing social themes and sub-categories.

Social themes	%	Sub-categories
Employee development (EDE)	8	Training and education, competence, employee engagement on sustainability issues
Employment (EMP)	8	Job opportunities, recruitments, terms of employment, trainee programs, indirect effects, creating jobs, retirement
Health, safety and well-being of employees (HSW)	8	Prevent accidents and hazardous situations, prepared to operate in the situations of emergency, regular safety audits, occupational safety and wellbeing, co-operation with labor unions, taking care of employees, sickness absenteeism, healthy working environment
Human and labor rights (HLR)	4	Prevent child labor and forced or compulsory labor, diversity and equity of workforce, develop working conditions, labor agreements, ILO, UN Global Compact
Law, legislations and regulations (LLR)	19	Environmental, industrial and national forest regulations, chemical regulations, recycling obligations, reporting and control regulations, EU's climate policy, Nature Conservation Act, Limited Liability Companies Act, Corporate Governance guidelines, Articles of Association, Code of Conduct, Securities Markets Act, UN Global Compact
Stakeholder engagement (SEN)	33	Memberships in associations and programs, co-operations, building a relationship, involvement in sustainability issues, shared value creation, community involvement, cross-sectoral dialogue
Standards (STA)	20	CE, CoC, EMAS, EU ecolabel, FSC, PEFC, GRI, IFRS, IAS, ILO, AEO, AAA-rating, Rating Alfa, CARB, DNV, ISO 14001, ISO 22000, ISO 50001, ISO 9001, BRC, SPM15, Nordic swan, OECD guidelines for multinational enterprises, UN Guiding Principles on Business and Human Rights, UN Global Compact, UN International Bill of Human rights

5.2. Deductive content analysis: Eight topics of interest (TOIs)

The topical sustainability issues also referred to as "topics of interest" (TOIs) in wood products industry were decided based on European stakeholder feedback and discussion in a stakeholder workshop (Helsinki 22.9.2014) (**research question 2**). The eight topics were selected to be both of interest for European stakeholders from the forest-based sector and they also need to show a clear societal relevance towards a bio-based and sustainable economy. (W3B WP1 project report 2015). The topics are identified as follows (with acronyms used in the text and figure captions):

1. Wood-based innovations (WBI)
2. Multifunctional forestry and forest ecosystem services (FES)
3. Forest conservation by forest management and production (CBP)
4. Forests and global warming (FGW)
5. Forests and economy (FEC)
6. Added value of wood (AVA)
7. Building with wood (BWW)
8. Efficient use of wood (EUW)

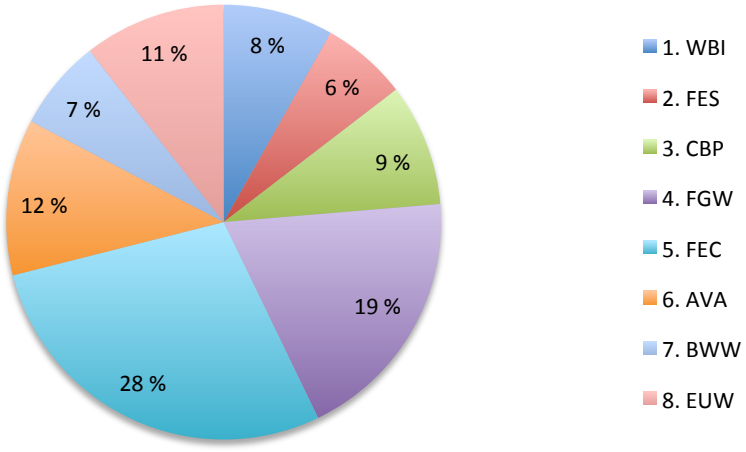


Figure 13. Distributions percentages of 8 TOIs in total sample (n=23).

Among the topics, the highest frequency of counts was received by *Forest and the economy* (FEC, 28%) and *Forest and Global warming* (FGW, 19%) as illustrated in Figure 13. Including both economic, environmental and social aspects as well as incorporating wide range of sustainability issues such as employment, income, energy, local environmental impacts and social impacts partially explains why FEC is the most commonly covered theme in sustainability-related online communication (Table 12). The sub-category of **employment** (f=166) refers to forest-based sector as an attractive employer in terms of enhancing well-being of employees, adapting health and safety standards, following labor rights and ethical practices as well as providing education and teaching programs to employees. The following quote by Veljekset Vaara provides a good example of this particular category:

> "In Veljekset Vaara Oy the social tenability includes managing the health and occupational safety of all employees according to existing laws and regulations. The company employs a long-term and broad personnel policy and good job satisfaction as important." (Veljekset Vaara, 20.5.2014)

Instead, forest sector as a significant local employer is illustrated by the presence of sub-category of **income** (f=91). Numerous quotes concerning employment numbers, revenue number, timber sales, income, salary, investments and national economy pertain to this category. By re-utilizing logging residues or wood by-products into bioenergy production and by providing renewable wood energy to households or certain regions like towns, forest-based sector can be classified as energy efficient and self-sufficient. Family business companies such as Kotkamills and Kuhmo highlighted the issues on their websites as follows:

> "The company is self-sufficient in terms of electricity and heat energy. The energy production plants consist of the combined-cycle heat and power plant using natural gas as fuel and of the soda recovery boiler, which is fuelled with the black liquor (biofuel) from the pulp mill. Almost half of the energy used at the site is generated by renewable fuels."(Kotkamills, 17.5.2014)

> "By-products such as pulp chips, sawdust and bark, are an important part of a sawmill's economy. All of the bark and sawdust produced is used to provide heat and electricity. Heat is used in our kilning process and in heating the town of Kuhmo." (Kuhmo, 19.5.2014)

By favoring renewable energy as the main source of energy instead of fossil-based ones, the forest sector improves it competitiveness in relation to other sectors and thus this cascade affects directly to *Forest and the economy* (FEC) through category

of **energy** (f=110). The category of **local environmental impacts** (f=132), encompassing strategies, policies and voluntary programs adapted by forest products industry companies for reducing such as emissions, toxic and chemicals from their production processes, scored the second highest frequency of hits within FEC TOI (see Table 12.). Family businesses communicate about minimizing impacts on the environment in general. Instead, associations and large companies considerably highlight continuously improving water-use efficiency and achieving systematic reductions in wastewater load by using wastewater treatment systems in addition to a decrease in airborne emissions. Moreover, Finnish Forest Industries Federation (16.5.2014) pointed out how environmental regulations like EU's climate policy affect directly to the competitiveness of forest industry by increasing the emission permit prices, electricity and transport costs. The new EU's policy framework for climate and energy published in January 2014 threats to increase costs 370-800 million euros annually for the Finnish forest industry. By 2030 emission permit price is expected to increase to 50 euros per carbon dioxide tonne as the price is currently around five euros. (Finnish Forest Industries 2014a). Also the individual forest companies must commit to these long-term objectives, which along with voluntary standards and tools (e.g. ISO 14001, PEFC, FSC and EMAS) form the basis for company's CSR achievements and thus sustainability-related communication.

Social responsibility including supporting social projects and local communities, implementing ethical practices and human rights along with giving donations is placed under the category of **social impacts** (f=79) from FEC. One example of a social project is illustrated by Metsä Group from the segment of large companies as quoted below:

> "I would like to warmly thank Metsä Group for its significant support to building the New Children's Hospital. It is great to have a globally operating Finnish company as a founding donor in our project. The old children's hospital, founded in 1946, was to a great extent built with the help of Finnish industry. The donation from Metsä Group shows that also today Finnish industry fulfils their social responsibility," says Anne Berner, chairwoman of the New Children's Hospital 2017 Foundation." (Metsä Group 10.6.2014)

Albeit *Forest and Global warming* (FGW) as a code is narrower than FEC, the topic of forest and global warming has a strong emphasis on forest industry operations and thereby on forest communication. The theme FGW has two viewpoints, either forests

(f=19) or wood material (f=386) as a carbon sink and storage. Of these, *wood* material received most of observations within the theme, since the category encloses ecological benefits of wood material and wood as a substitute for energy intensive materials and fuels. Double coding this with the category of recycling from TOI *Efficient use of wood* (EUW) contributed to the high score of TOI FGW-wood.

Topics of *Multifunctional forest ecosystem services* (FES, 6%) and *Building with wood* (BWW, 7%) received the lowest share of frequency counts in sustainability communication, since both themes are quite narrow. Although forest ecosystem services have reached a growing interest in recent years, it has been the most rarely communicated sustainability topic in forest products industry according to findings.

Table 12. Summary of TOIs and their sub-categories.

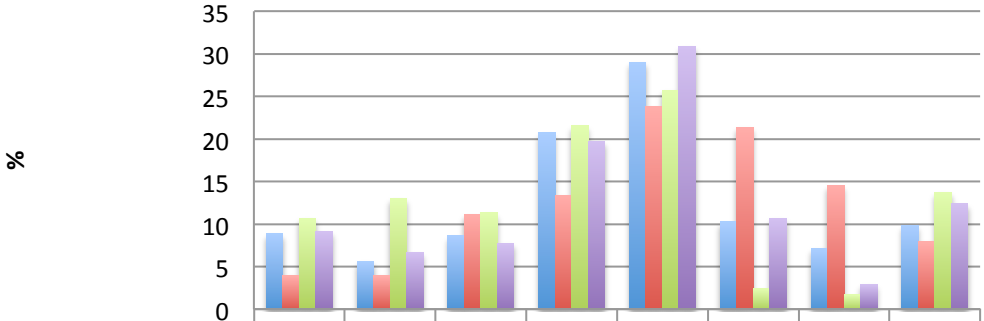
TOIs	Categories	Sub-categories
1. Wood-based Innovations (WBI)	**R&D**	Research investments, research departments, research awards, research co-operations, Research & Development activities
	Innovations	Product innovations, innovative technology, patent, research and innovation awards, novelty, high tech production, innovation capacity, innovation award, new field of application
2. Multifunctional forest ecosystem services (FES)	**Type**	Services protecting habitat, wildlife, biodiversity, chemical equilibrium, filter, climate, carbon sink, recreation, soil health, preventing erosion, non-timber forest products
3. Conservation by production (CBP)	**Harvest**	Locally harvested, origin of the wood, no tropical woods, harvesting methods and machines used, leaving retention trees and decaying wood on logging sites
	Responsibility	Sustainable forest management, responsible forest management, sustainable use of forests, quotes on conflicts between nature conservation and timber production, forest certification
4. Forests and global warming (FGW)	**Forests**	Carbon sink and storage, greenhouse gases
	Wood	Carbon sink, substitute for energy intensive materials and fuels, CO2 neutral, wood as renewable raw material, contribution of wood products to bio-economy
5. Forests and economy (FEC)	**Employment**	Qualified and happy employees, health and safety standards, ethics, education and teaching programs, supportive leadership, valuable employees, labor rights and agreements
	Income	Employment numbers, revenue number, timber sales, income, salary, financial operations, investments, national economy
	Energy	Supply of eco-energy, reduction of energy dependence through wood fuels, energy efficiency, environmental friendly production concerning global effects
	Local environmental impacts	Emissions (SO_2, NOx), pollutions, toxic, chemicals (COD, AOX, chlorine), legislations regarding sustainability, dust and noise, transportation, waste management environmental friendly production
	Social impacts	Donations, supporting social projects and local communities, enterprise with social responsibility, ethical practices, human rights, shared value
6. Added value (AVA)	**Emotion**	Emotional value attached to wood and forest, nature-bound, individual, warm, strong, real, aesthetics
	Health	Attached health benefits, antibacterial, essential oils, no softening agents, good for joints because of elasticity
	Labels	Ecolabels for sustainable forestry such as FSC, PEFC on the product and ecolabels for sustainable management such as Nordic Swan, EMAS, ISO 14001 ISO 22000, or quality ISO 9001, CE, GRI, OHSAS 18001, LEED
7. Building with 'wood (BWW)	**Performance**	Lightweight, durability, acoustics, temperature, stability, moisture, energy efficiency, fire-resistance, mainly technical performance, load-bearing capacity, ability to breath
	Image	Modern, high tech, multi-story buildings, green
	Substitute	Wood in comparison to other materials such as steel or concrete, cost-saving, energy-saving, fire-resistant, cause no CO2 emissions, ecological, quicker to build
8. Efficient use of wood (EUW)	**Recycling**	Use of recovered paper and fibre, waste paper, waste management, reuse of construction wood, energy production in the end of wood products' life cycle, resource efficiency
	Residues	Use of residues such as sawdust or other wooden by-products for energetic purposes. Including pellet production, maximum use of the log

5.2.1. Segment specific results on TOIs

As can been seen in Figure 14, the results by industrial segments are in line with the general results with a few exceptions. By focusing on certifications and other eco-labels as well as on health and emotional aspects of wood, *Added value* (AVA, 21%) achieved the second largest frequency count in sustainability communication within the segment of family businesses. Especially forest companies that work directly with end-users put focus on emotional and health issues as quoted below:

> "Log houses create an acoustically and aesthetically pleasing living environment and have been proven in studies carried out in Norway and Japan to have a positive impact on the health and happiness of human beings." (Honka Log Houses, 14.5.2014)

> "Wood is a natural, attractive decorating material, which increases living comfort. Wood is a versatile, easy, healthful and ecological material for interior decoration. Genuine wood has a naturally attractive and individual surface. Wood brings warmth to a home and it can easily be adapted and renewed if necessary." (Koskisen, 15.5.2014)



	1. WBI	2. FES	3. CBP	4. FGW	5. FEC	6. AVA	7. BWW	8. EUW
Large companies	9	6	9	21	29	10	7	10
Family businesses	4	4	11	13	24	21	15	8
Associations	11	13	11	22	26	2	2	14
Bioenergy producers	9	7	8	20	31	11	3	12

Figure 14. Segment specific results, in %.

Communicating the emotional and health aspects of wood are mostly related to the use of wood in construction of log houses or wood construction materials such as massive wooden products, plywood and chipboards. When communicating on health aspects of wood, the companies highlighted optimal indoor air humidity and ability to breath. In turn, when talking about emotional aspects of wood, companies disclosed aesthetics, warmth, feeling and beauty of wood material. This is confirmed by Muilu-Mäkelä et al. 2014 in recently published working papers of the Finnish Forest Research Institute. According to Muilu-Mäkelä et al. 2014, the wood material

can affect to the indoor air quality and thus to human health as well as it has also a stress lowering and stimulating effect on humans. Nonetheless, ecolabels such as PEFC and FSC certifications or ISO standards play the most essential part in sustainability communication of family businesses as regards AVA.

Building with wood (BWW) was the most covered topic within family businesses (15%) compared to distribution of sustainability topics in other segments. The industrial and innovative concepts in wood building makes multi-storied wood constructions truly competitive alternative in comparison with steel and concrete (Kivistö et al. 2013). As the findings of this study and a research of Mahapatra et al. (2012) address, carbon sequestration in wood, employment creation, reduction in building costs and benefits of lightweight construction and easy transport of the wooden elements to the building site are the benefits of using wood in construction purposes along with energy efficiency and ecological benefits. Moreover, the Strategic Program for the Forest Sector (MSO) together with other research and development activities as well as new industrial construction concepts is underlying causes of increasing wood construction (Karjalainen 2014, Ministry of Economy and the Employment 2014).

Wood-based innovations (WBI, 4%) received the lowest frequency of hits within the segment of family businesses i.e. sawmilling and log house companies. They focus mainly on advertising products and technical features of products to the end-users instead of focusing on research and development activities (R&D) and innovations. In relative terms, associations highlighted WBI most frequently by the share of 11 %. One of the most important functions of associations is to communicate current issues, notices and reforms affecting the sector or industry. Recently innovations and development activities are related to the concept of bioeconomy as the quote below illustrates:

> "Forest industry bioeconomy growth sectors include the construction and interior design sectors, packaging and soft tissue sectors as well as bio-based energy. New bioeconomy products include bioenergy, biofuels and biochemicals as well as biocomposites in which wood is combined with other materials." (Finnish Forest Industries Federation, 16.5.2014)

In turn, associations communicate least about *Added value* (AVA, 2%), as the sustainability communication in the segment does not relate to product feature, impacts at product or customer level.

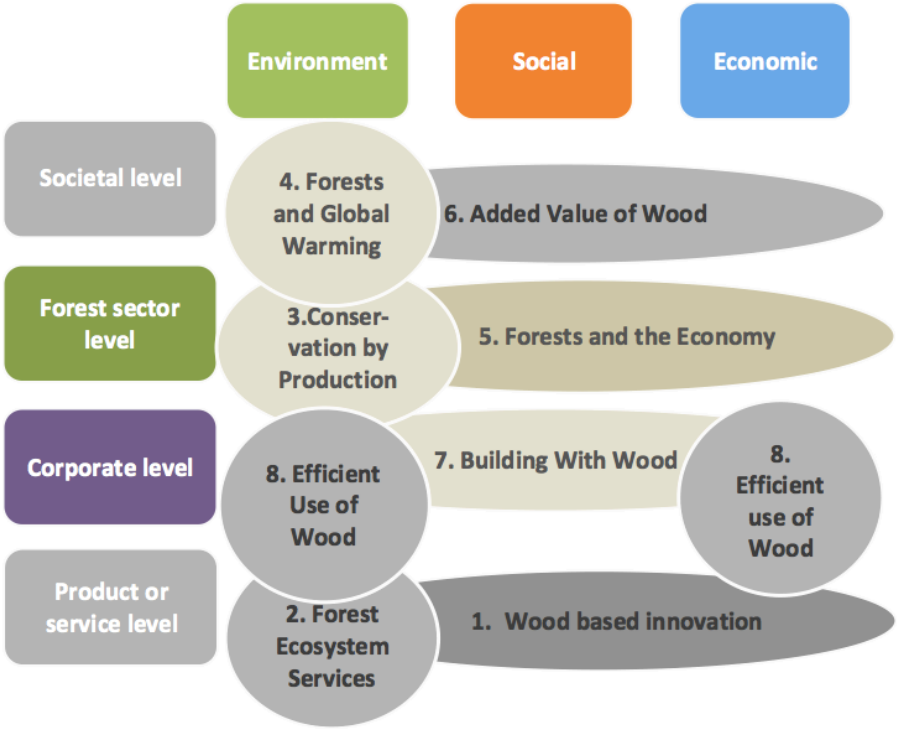


Figure 15. Eight TOIs and their alignment with level of analysis and dimensions of sustainability (environmental, social and economic sustainability).

The point of departure is that the three-dimensional concept of sustainability including environmental, social and economic sustainability can be implemented on four hierarchical levels, such as societal, sectoral, corporate and product or service level (Figure 15). Eight Topics of Interests (TOIs) can be targeted to a two-dimensional matrix of hierarchical levels and the three-dimensional structure of sustainability. This is based on a definition of each level and dimension presented in Chapters 1.2.3 and 3.1.

Wood-based innovations (WBI), *Building with wood* (BWW), *Added value of wood* (AVW) and *Forest and the economy* (FEC) are embodied in all sustainability dimensions and the other TOIs are more specifically focused on certain dimensions. The TOI of *Forest ecosystem services* (FES) contain all insubstantial services and material goods provided by nature, hence the TOI falls into a product or service level and under environmental sustainability. Instead, maximizing use of the log by using

wood efficiently (EUW) affects through cost savings and waste management to both economic and environmental sustainability at the corporate level. Reflected to the features of product sustainability level presented in introduction part (Chapter 1.2.3.), TOI *Added value* (AVA) with emotional aspects and health impacts along with ecolabels of wood product or material can be placed to both a societal level and to the product level. However, since the main focus of the research lies in the sectoral and corporate level, the study aims to explain more in detail about TOIs implemented in these two levels.

The alignment of TOIs in Figure 15 corroborate the statement of Finnish Forest Industries Federation (2013b) that forest sector level encompasses widely environmental, social and economic sustainability dimensions. In addition to obligatory regulations and commitments set by the societal level, companies, organizations and suppliers have to also follow the sustainability requirements stated by the forest sector. These requirements or arrangements are to improve the sustainability of forest sector's actions in comparison with other sectors. The requirements are for example sustainable and responsible forest management, nature conservation and forest certification from TOI *Conservation by production* (CBP) as well as labor rights and agreements, income aspect of forestry, energy efficiency, minimizing local environmental impacts and improving social impacts from TOI *Forest and the economy* (FEC).

In the end, regulations, requirements and standards set by the societal and sectoral levels are enforced in practices of *Efficient use of wood* (EUW) and *Building with wood* (BWW) on a corporate level. These two TOIs are the most suitable for the corporate level, since application of a wood material and material reuse can be seen as a part of the company's core business.

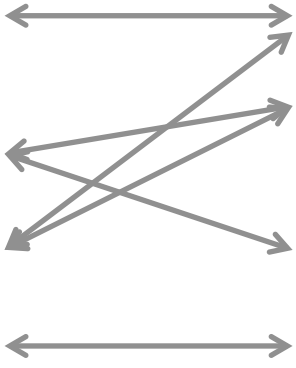
5.3. Discussion of comparative results

The mutual similarities can be found from both inductive and deductive content analysis, as presented in the following Table 13. TOI *Forest and economy* (FEC) from deductive analysis together with *Financial arrangements and operations*

(FOA) and *Environmental impacts* (EIM) from inductive analysis have almost identical content with each other. This is because the TOI FEC includes both income (i.e. revenue numbers, income, salary, financial operations and investments) and environmental aspects. Also, preventing climate change and positive carbon impacts of forests and wood material occur in both *Environmental impacts* (EIM) and *Forest and global warming* (FGW). *Material sustainability* (MSU) along with recyclable and renewable features of wood material synchronizes with both *Forest and global warming* (FGW) and *Efficient use of wood* (EUW). The sustainability theme of *Environmental protection and biodiversity conservation* (EPB) works contextually hand by hand with TOI of *Conservation by production* (CBP).

Instead, *Stakeholder engagement* (SEN) from inductive research as well as *Added value* (AVA) and with *Building with wood* (BWW) from deductive research do not have an exact substitute in a reverse research. Albeit, a sub-category, the support of social projects and the local communities from *Stakeholder engagement* (SEN, inductive) can be also found from *Forest and economy* (FEC, deductive) as well as a theme, *Standards* (STA, inductive), can be found from the sub-category of *Labels* from *Added value* (AVA, deductive).

Table 13. Similarities in top five themes of inductive and deductive analysis.

Inductive	Common	Deductive
Financial arrangements and operations (FOA)		Forest and economy (FEC)
Stakeholder engagement (SEN)		Forest and global warming (FGW)
Material sustainability (MSU)		Added value (AVA)
Environmental impacts (EIM)		Efficient use of wood (EUW)
Environmental protection and biodiversity conservation (EPB)		Conservation by production (CBP)

In comparison to segment specific results, it can be noted that in both research ecolabels and standards (e.g. PEFC and FSC) are frequently communicated topics within family businesses in relation to other segments and sustainability themes. A

same clear conclusion on consistency cannot be made among other segments when comparing findings of inductive and deductive analyses.

5.4. Stakeholder orientation in online communication

The final research question focuses on the role of different stakeholder groups in defining the content of sustainability communication and communication strategies implemented in online communication within large companies, family businesses and associations in wood products industry (**research question 3**). Due to bioenergy producers overlap with companies from the other segments they are not examined separately in following sub-sections.

.

5.4.1. Communication strategies implemented in online communication

Large companies, family businesses and associations in the forest products industry are exploiting a web-based communication. The target audience, the nature of the communication and the use of different online communication channels need to be analyzed to examine their CSR communication strategies (Morsing and Schultz 2006).

Stakeholder information strategy. Large companies including Stora Enso, UPM-Kymmene and Metsä Group have been implementing *the stakeholder information strategy*, a one-way symmetrical model of communication, by sharing sustainability information about company's operations on their websites along with their online reports and brochures. Nowadays, demand and expectations of stakeholders on sustainability performance regarding environmental, social and economic sustainability are tightened especially towards globally operating companies. Internationally operating companies, Stora Enso, UPM-Kymmene and Metsä Group, communicate their sustainability operations extensively on their website and through their annual responsibility reports. Principal content of 'Responsibility' or 'Sustainability' section on the websites center around ethics, use of forests, sustainable forest management, policies and guidelines, environmental impacts, certificates and stakeholders. As reported by Lundquist (2010), most of company

stakeholders find corporate websites to be more significant and up-to-date source of sustainability information than sustainability reports.

In order to provide efficient communication on a company's sustainability operations, the company needs to customize the content and the channel to meet the expectations and requirements of various stakeholders (Dawkins 2004). An official corporate website usually contains several pages that are addressed to various stakeholder groups (Esrock and Leichty 2000). Large companies have a separate webpage for investors where is included financial information and annual reports about debt, shares, governance and the company results (see **Financial arrangements and operations, FOA**). Generally, numerical and detailed information of a company's operations is directed to authorities while consumers require a clear message that appeals to their emotions (Halme et al. 2011).

Through a 'Media center' comprising press and stock realizes, news, publications and image bank, companies attempt to share the latest news, insights and other company material for the press and other stakeholders. For potential employees, they offer open jobs, opportunities such as internships and trainee programs for students and also share career stories under a webpage of 'Careers'. In addition to explicit information targeted to certain key stakeholders, Stora Enso and Metsä Group have their own websites for wood supply where they provide information on sustainable forestry, wood trade and optional conservation as well as various consultation services for forest owners. For instance, Finnish forest owners can register on Metsä Group's website into "Metsäverkko" in which they can receive invitations to events and news regarding forestry.

Contrary to large companies, sustainability-related information that family businesses share on their official websites mostly focus on environment aspects as in forest certifications, sustainable forest management and recyclability of wood material. The stakeholder information strategy in online communication within family businesses manifests itself primarily in product catalogues and financial numbers. To make an exception, a few of family businesses publish a web magazine (Koskisen) and environmental reports (Kotkamills) on their websites. Instead, a one-way symmetrical model of communication within the segment of associations

embodies in news, press releases, handouts, articles, teaching and learning materials for schools and various online downloads that cover both sustainability and other topical issues at the moment.

Same as for large companies, family businesses have in most cases a separate webpage for procurement i.e. forest owners and professional constructors or business partners, to gather customized information for them. Customer bonds between sawmilling companies and forest owners that comprehend a professional guidance in matters of timber-sales transaction, memberships, service contracts and long-term relation of timber-sales transaction, have a significant impact on the actualized timber selling behavior of forest owners (Kärhä and Oinas 1998). For associations the key stakeholders, collaborative partners and association members, have a controlled access into the system provided by the association for extra services and materials. The general information provided on an association's website is targeted to the general public in addition to aforementioned stakeholder groups. The allocation of information to certain stakeholder groups through separate webpages and websites, however, does not reveal whether the company has fulfilled its stakeholders' curiosity and requirements.

Stakeholder response strategy. The segment of large companies and few of family businesses and associations apply *the stakeholder response strategy*, two-way asymmetric communication, by conducting feedback and comments from stakeholders via a feedback or a contact form that they have on their websites. In the feedback form a visitor can fill an open comment, general feedback, question, report websites misbehaves or errors in some specific section on the website. A visitor is also asked to share his or her contact information to receive a reply from the company. Stakeholders are also able to contact company representatives by phone or e-mail directly. Through these channels, stakeholders have an opportunity to respond to the company's actions and companies have a possibility to integrate received comments and suggestions with their actual operations and sustainability communication. Responding to stakeholders is yet rather sender oriented, although continuous communication and discussion via e-mail or phone may be perceived as a two-way method between the company and a stakeholder. This way of

communication, however, cannot be compared to stakeholders' pro-active engagement as in mutual dialogue (Morsing and Schultz, 2006).

Stakeholder involvement strategy. Nowadays, the mutual dialogue is the most preferred way for companies to influence and also seek to be influenced by stakeholders through e.g. various social media channels (Morsing and Schultz 2006, Branco and Rodrigues 2006, Niskala et al. 2013). When it comes to *the stakeholder involvement strategy*, companies and associations refer briefly to their social media channels on their websites. These references are mostly represented as an icon of a certain social media channel such as Facebook, Linkedin, Twitter, Youtube or a company's blog and by clicking on them the visitor is guided to a next page. To depart from the theory of CSR communication strategies presented by Morsing and Shultz (2006), public consultation forums, ongoing surveys or other web-based tools for the real two-way discussion, also known as mutual dialogue, between the company and its stakeholders cannot be discovered by observing corporate official websites. Purportedly, these channels either require a separate online-platform and registration (with username and password). The communication on these channels is an issue to investigate more in the future.

As listed on Table 14, every large company of the study has an active presence on social media platforms. To be more precise, Stora Enso has reached to the highest number of followers on Facebook and Linkedin whereas UPM-Kymmene has the most followers on video-sharing website Youtube. Nevertheless, it should be noted that the amount of followers on social media varies continually, even within a day.

Table 14. Social Media activity based on number of followers and views, Segment of large groups (viewed 11.2.2015).

Company	Facebook	Linkedin	Twitter	Youtube
Stora Enso	5 396	23 737	3 132	118 263
UPM-Kymmene	2 385	16 305	3 670	300 091
Metsä Group		4 602	1 205	93 509

Moreover, Stora Enso offers an opportunity for forestry professionals, forest owners and people interested in forestry to write their thoughts in Stora Enso's forest blog. Instead at UPM the company's representatives are in charge of writing posts on the blog. The dialogical aspect of a blog bases on comments and questions that readers can leave under a certain blog post.

In comparison to large companies, the activity on social media varies a lot within family businesses; some of them utilize more than two social media channels (Koskisen, Vapo, Siparila and Honka log houses) while for some online communication takes place only on their own websites (Luvia Wood, Isojoen saha and Westas). According to social media followers, log house companies are more aware of using various social media channels for reaching their stakeholders than sawmilling companies. This may result from log house companies operating directly with end-users, customers and contractors. In case of Junnikkala, Kotkamills, Kuhmo and Versowood having only fewer than 15 followers on Linkedin indicates rather low or nearly non-existent activity on social media (Table 15).

Table 15. Social Media activity based on number of followers and total views for videos on Youtube, Segment of family businesses (viewed 11.2.2015).

Company	Facebook	Linkedin	Twitter	Youtube
Luvia Wood				
Junnikkala		2		
Keitele Group	530	419	10	
Koskisen	405			
Kotkamills		10		
Kuhmo		1		
Isojoen Saha				
Pölkky	348			
Vapo	209	541		100 041
Veljekset Vaara	181			
Westas				
Versowood		5		
Siparila	1 278		6	513
Kuusamo Log Houses	1 278			13 457
Honka Log Houses	7 592	451	217	

According to results presented in Table 16, the presence on Linkedin does not appear to be relevant for the segment of forest associations, since the main purpose of creating a company page on Linkedin is to help Linkedin members learn about the company's business, brand and job opportunities (Linkedin 2015). Instead, associations, especially Finnish Forest Industries Federation and Finnish Forest Association through Forest Speaks- project, relatively actively operate on Facebook and Twitter. Since the Forest speaks- project functions under Forest Association, the project's Facebook page represent association's presence on Facebook simultaneously. That explains the same amount of followers they have on Facebook (Table 16).

Generally speaking, the size and internationality of a company correlates positively with the level of social media presence based on the findings of the study. In addition, international companies such as Stora Enso and UPM may have several Facebook pages for different countries or business dimensions. This study solely investigated the official company pages on social media channels.

Table 16. Social Media activity based on number of followers and total views for videos on Youtube, Segment of associations (viewed 11.2.2015).

Association	Facebook	Linkedin	Twitter	Youtube
Finnish Sawmill Association	13			
Finnish Forest Association	1 377		42	
Forest Speaks-project	1 377		1 049	53 128
Finnish Forest Industries Federation	1 410		1 607	3 637

In this and Teemu Haarasilta's study (2013) Facebook was the most popular channel among forest companies. This study, however, only analyzes the content of forest products companies' and associations' websites and evaluates their current social media presence, not their social media performance. Gomez and Chalmeta (2011), Capriotti and Moreno (2007) and Dawkins (2004) criticize that communication on social media can be seen as a missing link in the company's sustainability practices in terms of developing online communication process more interactive way.

Companies are rather focusing on the presentation of the information content and the visual aspect than enhancing dialogue with different stakeholders (Capriotti and Moreno 2007).

The social media activity of forest companies investigated by Haarasilta (2013) is divided as follows: manufacturers such as Stora Enso, UPM, Metsä Group and Koskisen focus on engaging consumers in communication and presenting company's values along with ethical principles whereas log house constructors (e.g. Honkarakenne) on marketing and brand building. Social media as a feedback channel arouses diverging views. According to the Lundquist (2010), stakeholders wish for companies to answer their questions by using social media. Instead, social media platforms have been seen as a channel for sharing information and different kind of content like photos. (Haarasilta 2013).

5.4.2. Key stakeholder groups in wood products industry

The framework created for this study (p.37) suggest that companies should engage their key stakeholders into decision making process (Halme et al. 2011) in a long term. The stakeholder engagement is implemented through constant dialogue by first defining key stakeholder groups (Jamali 2008, Niskala et al. 2013) and online communication channels (Dawkins 2004, Morsing and Schultz 2006) and then select sustainability themes to communicate in consideration of stakeholders diverse needs and demands (Dawkin 2004, Panwar et al. 2006, Mark-Herbert and von Schantz 2007). Rigorous analysis of the *descriptive* level, whether and how the company responds to the needs of its stakeholder, and *instrumental* level, whether stakeholder needs are beneficial for the company from the stakeholder theory (Donaldson and Lee Preston 1995), require further research.

Although, assumptions on stakeholder needs in forestry can be made based on the findings by Sharma and Henriques (2005). According to these findings, stakeholder influences towards companies environmental action are such as customer demand for certification (see **Standards**, **STA**), employee involvement in environmental taskforces (see **Employee development, EDE**), regulations set by authorities (see

Law, legislations and regulations, LLR) and NGOs environmental lobbying (see **Stakeholder engagement, SEN**). Additionally, Kärhä and Oivas (1998) concluded that forest owners seem to be pleased with the fact that companies take notice on environmental values such as retaining dead trees on harvesting site and trees in forest areas with essential biodiversity values (see **Environmental protection and biodiversity conservation, EPB**). According to Lundquist (2010), the most vital pieces of environmental information from the stakeholder viewpoint are information on the environmental impact of the company's products and services (see **Environmental impacts, EIM**), environmental targets and an explanation of climate change strategy among other things. From the social aspect supply-chain management, human rights policy or declaration (see **Human and Labor rights, HLR**) and the data of community investment and employees are the most popular topics for stakeholders. The stakeholder groups of wood products industry, stakeholder involvement aspect on sustainability-related online communication (two-headed arrows) together with sustainability themes emerged from the data are illustrated in Figure 16 below.

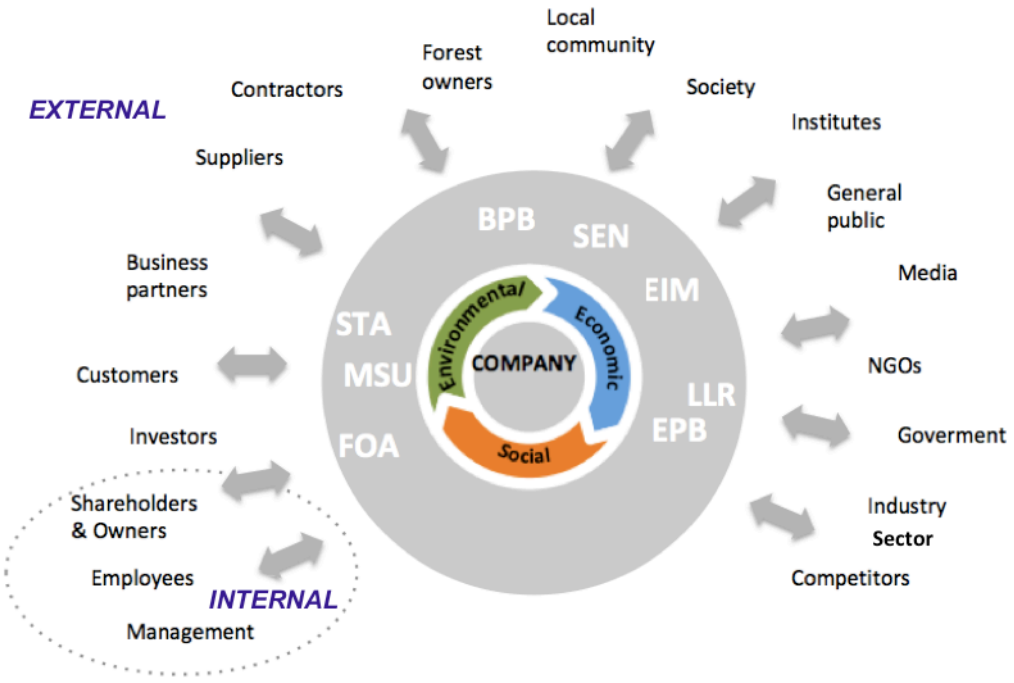


Figure 16. Sustainability-related communication of wood products industry with its stakeholder groups; divided in internal and external stakeholders.

In this study the determining of stakeholder groups in wood products industry is based on stakeholders emerging through inductive content analysis. In other words, stakeholders that were mentioned on forest companies' and associations' websites were placed in Figure 16. They were divided into internal stakeholders and external stakeholders based on previous literature.

The number of references received from the inductive analysis refer to that customers, institutes, business partners, suppliers, employees, management, shareholders and owners play generally a significant role in operations of forest products industry. As Cornelissen (2011) note, these key stakeholders have an essential role in a forest company's or association's decision-making process and its operations. Nevertheless, the role of other stakeholder groups such as communities, competitors, contractors and forest owners is also important. Supporting communities and society is included in forest companies' sustainability activities as quoted below:

> "We generate well-being at work, in local communities, and in society at large and commit to global sustainability principles. By behaving responsibly towards our employees and society, we can improve the quality of life of our stakeholders." (Metsä Group, 10.6.2014)

This also supports the fact that **Stakeholder engagement (SEN)** i.e. building a relationship with stakeholders and involving stakeholders such as communities, was frequently communicated sustainability theme within the sample. Typically, companies create added value and stable employment for communities while providing them environmental safety and committing them to sustainability development. (Papasolomou-Doukakis et al. 2005, Longo et al. 2005, Panwar et al. 2006, Morsing and Schultz 2006).

The main emphasis on stakeholder groups in inductive content analysis varies depending on whether a large company, a family business or an association is in question. When discussing about key stakeholders, large companies mainly address employees, customers, suppliers and management on their website. However, according to explicit information targeted to certain key stakeholders on websites, forest owners and investors can be also included as key stakeholders of large forest companies (see Chapter 5.4.1.).

In turn, family businesses are more customer-oriented in relation to stakeholder distribution of other segments. They aim to meet the needs and expectations of their customers or consumers by providing transparency information on their products and services. They have also gathered customized information for forest owners and professional constructors or business partners on their websites (see Chapter 5.4.1.). As for associations, the high commitment to institutes (e.g. schools and research institutes), forest industry players and society was recognized from the website content. These together with collaborative partners and association, who have often controlled access to an association's extra services (see Chapter 5.4.1.), form a core of key stakeholders of associations. To ensure that a company or an association fulfill needs of key stakeholder groups in the long rung (Donaldson and Lee Preston 1995, Dawkin 2004, Panwar et al. 2006, Mark-Herbert and von Schantz 2007, Niskala et al. 2013) sustainability web-based communication need to be investigated from the stakeholder point of view.

6. Conclusions

6.1. The contribution and limitations of the study

As a result of the qualitative research method, twenty-three (23) Finnish forest products companies and organizations were selected to represent the population. This sample was divided into four segments – large companies, family businesses, associations and bioenergy producers – to examine the key differences in sustainability themes, online communication channels and target stakeholders between segments. One weakness of this method is double the counting of companies in both bioenergy producers' segment and other organizational segments (see overlaps in Chapter 4.3: Table 6). However, it would have been impossible to avoid this since the sample companies operate in several industry branches (e.g. in pulp and paper and / or bioenergy) along with wood products industry. At the same time, they are the most representative and information-rich forest products companies in Finland. The reason for choosing bioenergy producers as its own segment was that energy plays a crucial role in forest industry when alternative bio-energy and other bio-based innovations derived from wood act as a substitute for fossil-based alternatives.

In processing data and coding content into categories, the main issue in inductive content analysis was to select the suitable coding unit, balance scope of the sustainability themes and control the multiply coding of the content. As frequency counts were based on the frequency of quotations in both inductive and deductive analysis, the only reason to decide the suitable length of a quotation is to maintain the context of the text – *creditability* – during the abstraction process. Nevertheless, in coding several long quotes in a row with a same code instead of coding the whole section affects the number of frequencies. To eliminate this, the coding unit comprised invariably of paragraphs and sections if the same theme continued for more than a few sentences. This study examined the occurrence and prevalence of sustainability themes in web-based communication by focusing on the frequencies of

sustainability themes emerged from data. This required a detailed analysis of the context.

Objectivity in qualitative research is a tricky question and impossible to implement hence the researcher is intimately involved in conducting research (Ratner 2002). Balancing the scope of sustainability themes in inductive content analysis required to repeat steps of qualitative content analysis process several times before generating the final coding frame of the categories. Some of the sustainability themes were too wide (e.g. Financial arrangements and operations, FOA) and some quite narrow (e.g. Employee development, EDE), which correlated directly to the number of frequencies. The coding logic including granting permission for double coding need to be clear and consistent from the beginning of the analysis. The multiply coding between sustainability themes (code families) was fully permitted in inductive analysis as some quotes refer more than just one sustainability theme. In reverse, double coding were attempted to be avoided in deductive analysis to achieve comparable outcome with other European countries (i.e. Slovenia, Germany and Austria) from international research project 'W3B: Societal perceptions of forest sector on sustainability'.

Maintaining the consistency in the coding process ensured the reliability of the study. The content was analyzed inductively and deductively during an uninterrupted period by the same coder to ensure that the coding scheme has not changed over the time. In inductive analysis, the categorization of the content and implementation of abstract knowledge into concrete forms are based on "triple-bottom line"-model by Elkington (1997). Whereas in the deductive analysis the "topics of interests" (TOIs), decided by European stakeholders, embody the most topical sustainability issues from the viewpoint of the forest-based sector. The third analysis examined the current state of online communication and outlined the stakeholder groups of forest products industry. This was conducted through inductive content analysis and by manually and systematically experiencing websites and social media channels to maintain the reliability of the study.

The validity of the results is ensured by a combination of inductive and deductive approaches. Additionally, the stakeholder engagement has been investigated in two

ways, through inductive content analysis and by examining webpages manually. In the end, the sample size (n = 23) and data selection method were convenient for the purpose of the study. The selected sample represented diverse portfolios of forest products industry by including companies in various sizes and different industry sectors along with forest associations. To fulfill these terms, the study provided comprehensive information on the phenomenon (see the results and discussion in Chapter 5). Also coding frame represented the concepts – topical sustainability themes – in the research questions (Schreier 2012). The coding process followed suggested patterns and stages of qualitative content analysis to improve validity of the content classification (see Elo and Kyngäs 2008, Schreier 2012).

In previous studies, the focus has been either on CSR reports or social media in sustainability communication in forest industry. Sustainability-related web-based online communication in Finnish wood products industry has not been studied extensively. Thus this study fills the gap in the past scientific literature. By applying both inductive and deductive approaches to investigate the current sustainability themes, of which forest companies and associations are discussing on, can be considered as a strength in this study. As presented in previous chapters, corporate official website is the most significant communication and information-sharing channel nowadays, since the social media is not fully exploited among forest industry players. Generally, the study provides new insights and creates understanding of phenomenon of the sustainability-related online communication in forest products industry.

6.2. Final thought and recommendations for further research

Sustainability and CSR has become a crucial part of business strategies and corporate communication, particularly for forest industry that has a significant impact on environment and the surrounding society. The study explored the current state of sustainability communication and identified how web-based communication strategies are utilized to engage stakeholders within large companies, family businesses, associations and bioenergy producers in Finnish wood products industry. Based on the results, the wood products industry in Finland has increasingly paid

attention to its operations and communication of CSR as well as improved its stakeholder engagement.

The current state of sustainability-related online communication mainly center around environmental factors such as on material sustainability, environmental impacts, along with environmental protection and biodiversity conservation. However, social factors have increasingly taken a root in sustainability-related communication. Forest companies and associations communicate frequently on engaging and involving their stakeholders in their sustainability operations along with collaborating with them. In comparison to other segments, the web-based sustainability communication within family businesses, especially the small ones, still mainly consists of presenting certifications (i.e. PEFC and FSC), ecolabels and standards (e.g. ISO 14001 and OHSAS 18001) they have implemented as a reference to company's sustainability operations. This is due to that the family businesses in sawmilling and wood construction sectors are more customer-oriented in case of selling services and products to wholesalers, retailers or private consumers (see Chapter 1.1: Figure 2). In addition to certificates (Sharma and Henriques 2005), consumers require a clear message that appeals to their emotional side (Halme et al. 2011) along with transparency information on quality and safety of products and services (Papasolomou-Doukakis et al. 2005, Longo et al. 2005, Panwar et al. 2006, Morsing and Schultz 2006). These issues are communicated within forest products industry based on the findings of the study.

From the main topical sustainability issues, the economic values in forestry including employment, income, energy, local environmental impacts and social impacts and the role of forests in global warming are essential talking points in wood products industry. Although forest ecosystem services have reached a growing interest in recent years, it has been the most rarely communicated sustainability topic in the industry. The reflection on sustainability issues chosen by European stakeholders from the forest-based sector shows that a higher share of forest products industry companies and associations communicate these issues on their websites to a varying extent. Nevertheless, the very specialized information requirements of other stakeholder groups require further research. The follow-up studies should concentrate on investigating the sustainability communication from a stakeholder's

viewpoint: what are the needs and expectations of various stakeholder groups towards CSR and do they feel that organizations are responding to these requirements? These studies could be carried out by using focus groups, themed interviews or a survey questionnaire. The similar researches that utilize quantitative survey method with Likert-scale format questions and qualitative open questions in investigating stakeholder perceptions were conducted by Kiviluoma (2013) and Grayling (2013). Alternatively, themed interviews and interactive session of focus group are useful tools for gathering in-depth information and capturing a range of perceptions from different stakeholders (Braddock 2006).

Based on the findings, forest products industry companies and forest associations communicate their sustainability issues mainly by utilizing stakeholder information strategy, in other words, by sharing one-sidedly sustainability information on their websites and in online-reports. Mostly, companies have divided customized information into separate webpages or websites to meet certain stakeholder groups' (e.g. investors, forest owners, potential employees, partners) requirements**. In terms of defining the content of sustainability communication**, the financial information on company arrangements and operations is directed to investors and authorities whereas for forest owners the content of information consists mainly of advices on sustainable forestry. Consumers or customers instead require product-specific information on health aspects and other additional values of wood (Halme et al. 2011).

In addition to corporate websites as information source of stakeholders, companies engage their stakeholders in web-based sustainability communication in wood products industry by conducting a feedback or providing a chance for stakeholder to contact company representatives via e-mail. Genuine mutual dialogue on sustainability issues with stakeholders can be achieved through various social media channels that most of the sample companies have applied. Nevertheless, stakeholder expectations about tailored communication were rarely expressed in explicit terms. The lack of a rigorous analysis of companies utilizing social media channels as a tool for involving stakeholders in decision-making process concerning company's sustainability issues made the evaluation of the communication effectiveness difficult. In the end, the size and internationality of the wood companies correlated

positively with the level of social media presence, indicating that the implementation of feedback mechanisms or social media channels among smaller size wood companies were rather poor. Such conclusions can also be drawn of forest associations.

In the future, forest companies need to emphasize on involving and engaging their stakeholders in sustainability decision-making process through social media along with improving their social media activity. In the future, the effectiveness of web-based communication between the companies and their stakeholders should be investigated further by canvassing potential channels, web-based tools, ongoing surveys or consultation forums of companies. Discourse analysis is a method that could be used for analyzing the state of discussion (e.g. see Pollach 2003).

References

Literature

Andriof, J. & Waddock, S. 2002. Unfolding stakeholder engagement, in Andriof, J., Waddock S., Husted, B. & Sutherland Rahman, S. (Eds). Unfolding Stakeholder Thinking: Theory, Responsibility and Engagement. Greenleaf Publishing. Sheffield. 19-42 p.

Berelson, B. 1952. Content analysis in communication research. Glencoe, Ill.: The Free Press.

Berg, B. L. 2009. Qualitative research methods for the Social Science. Seventh edition. Pearson Allyn and Bacon. Boston. p. 48-51 & p. 338-377.

Braddock, M. A. 2006. Community stakeholder perceptions of non-native and invasive plants in Southern Illinois: A multiple methods assessment. Dissertation.

Branco, C. B. & Rodrigues, L. L. 2006. Corporate social responsibility and resource-based perspectives. Journal of Business Ethics 69: 111–132.

Brearton, S., Gross, R. & Ranney, K. 2005. Corporate social responsibility: 2nd annual ranking. Report on Business Magazine 37–68.

Capriotti, P. & Moreno, A. 2007. Corporate citizenship and public relations: The importance and interactivity of social responsibility issues on corporate websites. Public Relations Review 33: 84–91.

Carroll, A. B. 1979. A three dimensional conceptual model of corporate social performance. Academy of Management Review 4(4): 497–505.

Cavanagh, S. 1997. Content analysis: concepts, methods and applications. Nurse Researcher 4(3): 5–16.

Clarkson, M. E. 1995. A stakeholder framework for analyzing and evaluating corporate social performance. Academic of Management Review 20(1): 92–117.

Cornelissen, J. 2011. Corporate Communication: A Guide to Theory and Practice. Third edition. Sage Publications Inc. p. 48-53.

Costa, R. & Menichini, T. 2013. A multidimensional approach for CSR assessment: The importance of the stakeholder perception. Expert Systems with Applications 40: 150–161.

Lundquist 2010. CSR Online Awards 2010. Time to get real-time and personal. Available at: http://www.lundquist.it/csr-online-awards-survey-2010?cat_slug=whats-on/white-papers. [6/8/2014].

Lundquist 2011. CSR Online Awards 2011. Building trust in online audiences. Available at: http://www.lundquist.it/media/files/CSR_Online_Awards_Survey_2011.pdf. [6/8/2014].

Crane, A. & Matten, D. 2007. Business ethics: Managing corporate citizenship and sustainability in the age of globalization. Second edition. Oxford University Press. Oxford-New York. 57p.

Daub, C-H. 2007. Assessing the quality of sustainability reporting: an alternative methodological approach. Journal of Cleaner Production 15: 75–85.

Dawkins, J. 2004. Corporate responsibility: The communication challenge. Journal of Communication Management 9(2): 108–119.

Deegan, C. 2002. Introduction: The legitimizing effect of social and environmental disclosures – A theoretical foundation. Accounting, Auditing & Accountability Journal 26(3): 282–311.

Deegan, C., Rankin, M. & Voght, P. 2000. Firms' Disclosure Reactions to Major Social Incidents: Australian Evidence. Accounting Forum 24(1): 101–130.

Donaldson, T. & Preston, L. 1995. The stakeholder theory of the corporation: Concepts, evidence and implications. Academy of Management. The Academy of Management Review 20(1): 85–91.

Draper, S. 2006. Corporate responsibility and competitiveness at the meso level. Key models for delivering sector-level corporate responsibility. Corporate Governance 6(4): 409–419.

Dowling, D. 2001. Creating Corporate Reputation. Identity, Image and Performance. Oxford Univ. Press. Oxford. 29p.

Elkington, J. 1997. Cannibals with forks. The triple bottom line of 21st century business. Oxford: Capstone.

Elo, S. & Kyngäs, H. 2008. The qualitative content analysis process. Journal of Advanced Nursing 62(1): 107–115.

Esrock, S. L. & Leichty, G. B. 2000. Organization of corporate web page: Publics and functions. Public Relations Review 26(3): 327–344.

European Commission 2011. A renewed EU strategy 2011-14 for Corporate Social Responsibility. Communication from the Commission to European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels, 25.10.2011.

European Commission 2012. Innovating for Sustainable Growth: A Bioeconomy for Europe. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels 13.2.2012.

European Union 2014. Directive of the European parliament and of the council amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by

certain large undertakings and groups. Legislative acts and other instruments. PE-CONS 47/14 MN/FC/vm DGG 3B – consilium. Brussels, 25 July 2014.

Finnish Forest Industries Federation 2013b. Responsibility at the heart of developing the bio-economy. Finnish forest industry commitments to environmental and responsibility issues. Available at: www.forestindustries.fi/mediabank/760.pdf. [5/5/2014].

Finnish Forest Industries Federation 2014b. Tackle climate change: Use wood. Available at: https://www.forestindustries.fi/newsroom/publications/. [07/12/2014].

Finnish Forest Research Institute 2013. Finnish Statistical Yearbook of Forestry. Finnish Forest Research Institute. Vammalan Kirjapaino Oy, Vammala. 295 p. Available at: http://www.metla.fi/metinfo/tilasto/julkaisut/vsk/2013/index.html. [6/5/2014].

Finnish Forest Research Institute 2014a. Finnish Forest Sector Economic Outlook 2014 – 2015. Available at: http://www.metla.fi/julkaisut/suhdannekatsaus/. [15/3/2015].

Finnish Forest Research Institute 2014b. Finnish Statistical Yearbook of Forestry. Finnish Forest Research Institute. Vammalan Kirjapaino Oy, Vammala. 289-290 p. Available at: http://www.metla.fi/metinfo/tilasto/julkaisut/vsk/2014/index.html. [15/3/2015].

Foster, D. & Jonker, J. 2005. Stakeholder relationships: The dialogue of engagement. Corporate Governance 5(5): 51–57.

Freeman, R. E. 1984. Strategic management: A stakeholder approach. Pitman, Boston, MA.

Golob, U. & Bartlett, J. L. 2007. Communicating about corporate social responsibility: A comparative study of CSR reporting in Australia and Slovenia. Public Relations Review 33: 1–9.

Gomez, L. M. & Chalmeta, R. 2011. Corporate responsibility in U.S. corporate websites: A pilot study. Public Relations Review 37: 93–95.

Graneheim, U. H. & Lundman, B. 2003. Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. Nurse Education Today 24: 105–112.

Grayling 2013. Stakeholder Perception Survey Global Communication Strategy Review. World Health Organization. Research Report. Available at: www.who.int/about/who_perception_survey_2012.pdf. [16/1/2015].

Greenwood, M. 2007. Stakeholder engagement: Beyond the myth of corporate responsibility. Journal of Business Ethics 74: 315–327.

Haarasilta, T. 2013. Social media in wood products marketing and collecting of end user driven product development ideas. University of Helsinki. Department of Forest Science. Master's Thesis.

Halme, M., Joutsenvirta, M., Jalas, M. & Mäkinen J. 2011. Vastuullinen liiketoiminta kansainvälisessä maailmassa. p. 252-253 & p. 260-265.

Hamann, R. 2003. Mining companies' role in sustainable development: The "why" and "how" of corporate social responsibility from a business perspective. Development Southern Africa 20(2): 237–254.

Han, X., Hansen, E., Panwar, R., Hamner, R. & Orozco, N. 2013. Connecting market orientation, learning orientation and corporate social responsibility implementation: is innovativeness a mediator? Scandinavian Journal of Forest Research 28(8): 784–796.

Hawkins, D. 2006. Corporate Social Responsibility: Balancing Tomorrow's Sustainability And Today's Profitability. Palgrave Macmillan. New York. 142 p.

Heath, R. L. & Palenchar, M. J. 2011. Corporate (Social) Responsibility and Issues Management Motive and Rationale for Issue Discourse and Organizational Change, in Ihlen, Ø., Bartlett, J. L. & May, S. (Eds). The Handbook of Communication and Corporate Social Responsibility. First Edition. John Wiley & Sons. West Sussex. 321 p.

Helkkula, A. 2014. The Qualitative Research Approach. Qualitative Research Methods. University of Helsinki. Department of Forest Science. Lecture handouts. [12/3/2014].

Hetemäki, L. & Hänninen, R. 2009. Outlook for Finland's forest industry production and wood consumption for 2015 and 2020. Working Papers of the Finnish Forest Research Institute 122. (Summary in English). Available at: http://www.metla.fi/julkaisut/workingpapers/2009/mwp122.htm. [19/3/2015].

Hong, S. Y. & Rimb, H. 2010. Short communication. The influence of customer use of corporate websites: Corporate social responsibility, trust, and word-of-mouth communication. Public Relations Review 36: 389–391.

Honka Log Houses 2013. Honkarakenne: Tilinpäätös 2013. Available at: http://www.honka.com/sites/honka.com/files/honkarakenne_tilinpaatos_2013.pdf. [10/12/2014].

Hämäläinen, J. 1987. Laadullinen sosiaalitutkimus käytännössä. Johdatus sosiaalitutkimuksen "käsityötaitoon". Kuopion yliopiston julkaisuja. Yhteiskuntatieteet. Tilastot ja selvitykset 2/1987. Kuopio.

Hänninen, R., Katila, P. & Västilä, S. 2013. Megatrendit muuttavat Suomen metsäalaa. Metsätieteen aikakauskirja 4/2013. Tieteen tori. 677 p.

International Finance Corporation 2007. Environmental, Health, and Safety Guidelines. World Bank Group, April 30 2007.

Jamali, D. 2008. A Stakeholder approach to corporate social responsibility: A fresh perspective into theory and practice. Journal of Business Ethics 82: 213–231.

Johnson, H. & Walck, C. 2004. Integrating sustainability into corporate management systems. Journal of Forestry 102: 32–39.

Juholin, E. 2004. For business or the good of all? A Finnish approach to corporate social responsibility. Corporate Governance 4(3): 20–31.

Keitele Forest 2014. Keitele Group: Tilinpäätös 2013. Lehdistötiedote. Julkaisuvapaa 27.5.2014. Available at: http://www.keitelegroup.fi/resources/public/Keitele_Group_tilinp_2013.pdf. [10/12/2014].

Kiviluoma, M. 2013. Stakeholder perceptions of communication of corporate social responsibility: Case Lappset Group. Master's Thesis. Aalto University School of Business. Department of Communication.

Kivistö, A., Ikonen, U., Tanskanen, T., Vakkilainen, E., Ojanen, P. & Pesari, J. 2013. Environmental strategy in forest industry from the administrative point of view : The forest industry development scenarios for 2020. Centre for Economic Development, Transport and the Environment. Reports 96/2013. Available at: http://urn.fi/URN:ISBN:978-952-257-876-1. [14/4/2014].

Kondracki, N. L., Wellman, N. S. & Amundson, D. R. 2002. Content analysis: Review of methods and their applications in nutrition education. Journal of Nutrition Education and Behaviour 34(4): 224–230.

Krippendorff, K. 1980. Content Analysis: An Introduction to its Methodology. Sage Publications. Newbury Park. p. 21-22 & 75p.

Kärhä, K. & Oinas, S. 1998. Satisfaction and company loyalty as expressed by non-industrial private forest owners towards timber procurement organizations in Finland. Research articles. Silva Fennica 31(1).

Kärnä, J., Hansen, E. & Juslin, H. 2003. Environmental activity and forest certification in marketing of forest products – A case study in Europe. Silva Fennica 37(2): 253–267.

Kuisma, M. 2004. Erilaistuminen vai samanlaistuminen? : Vertaileva tutkimus paperiteollisuusyhtiöiden ympäristöjohtamisesta. Dissertation. Helsinki School of Economics. A-232.

Kyngäs, H. & Vanhanen, L. 1999. Sisällön analyysi. Hoitotiede 11: 3–12.

Li, N. & Toppinen, A. 2011. Corporate responsibility and sustainable competitive advantage in forest-based industry: Complementary or conflicting goals? Forest Policy and Economics 13: 113–123.

Longo, M, Mura, M. & Bonoli, A. 2005. Corporate social responsibility and corporate performance: The case of Italian SMEs. Corporate Governance 5(4): 28–42.

Lähtinen, K. 2009. Assessing the resource usage decisions and financial performance in Finnish sawmills within the resource-based view framework. University of Joensuu. Faculty of Forest Sciences. Dissertationes Forestales 89.

Mahapatra, K., Gustavsson, L. & Hemström, K. 2012. Multi-storey wood-frame buildings in Germany, Sweden and the UK. Construction Innovation. Emerald Group Publishing Limited 12(1): 62–85.

Malmelin, K. 2011. Arvojen markkinat, oikeuttavat arvomaailmat suomalaisten suuryritysten yritysvastuupuheessa. Dissertation. University of Helsinki. Faculty of Social Science.

Mark-Herbert, C. & von Schantz, C. 2007. Communicating corporate social responsibility – Brand management. Electronic Journal of Business Ethics and Organization Studies 12(2).

Marrewijk, M. 2003. Concepts and definitions of CSR and corporate sustainability: Between agency and communion. Journal of Business Ethics 44: 95–105.

McDonald, S. & Young, S. 2012. Cross-sector collaboration shaping corporate social responsibility best practice within the mining industry. Journal of Cleaner Production 37: 54–67.

Melé, D. 2008. Corporate Social Responsibility Theories, in Crane, A., Matten, D., Williams, A., Moon, J. & Siegel, D. S. (eds.). The Oxford Handbook of Corporate Social Responsibility. Oxford University Press. Oxford-New York. 64p.

Metsä Group 2014. Financial Statements Bulletin 2013. Stock Exchange Release 1(29). 6 February 2014. Available at: http://www.metsagroup.com/Financial/Documents/Tilinp%C3%A4%C3%A4t%C3%B6stiedotteet/Metsa_Group_Financial_Result-2013.pdf. [10/12/2014]

Mikkilä, M. & Toppinen, A. 2008. Corporate responsibility reporting by large pulp and paper companies. Forest Policy and Economics 10: 500–506.

Morsing, M. & Schultz M. 2006. Corporate social responsibility communication: Stakeholder information, response and involvement strategies. Business Ethics: A European Review 15(4): 323–338.

Muilu-Mäkelä, R., Haavisto, M. & Uusitalo, J. 2014. Puumateriaalien terveysvaikutukset sisäkäytössä – Kirjallisuuskatsaus. Working Papers of the Finnish Forest Research Institute 320. Available at: http://www.metla.fi/julkaisut/workingpapers/2014/mwp320.htm. [27/2/2015].

Nord, T. 2005. Structure and developments in the solid wood value chain. Dominant saw milling strategies and industrialized housing. Licentiate Thesis No. 7. Luleå University of Technology.

Niskala, M., Pajunen, T. & Tarna-Mani, K. 2013. Yritysvastuu raportointi- ja laskentaperiaatteet. KHT pro. KHT-Media. Porvoo. p. 7-97.

Panwar, R., Han, X. & Hansen, E. 2010. A demographic examination of societal views regarding corporate social responsibility in the US forest products industry. Forest Policy and Economics 12: 121–128.

Panwar, R. & Hansen, E. 2007. The standardization puzzle: An issue management approach to understand corporate responsibility standards for the forest products industry. Forest Products Journal 57(12): 86–91.

Panwar, R., Rinne, T., Hansen, E. & Juslin, H. 2006. Corporate responsibility: Balancing

economic, environmental, and social issues in the forest products industry. Forest Products Journal 56(2): 4–12.

Papasolomou-Doukakis, I., Krambia-Kapardis, M. & Katsioloudes M. 2005. Corporate Social Responsibility: The Way Forward? Maybe Not! A preliminary study in Cyprus. European Business Review 17(3): 263–279.

Pappila, M. 2013. Forest certification and trust — Different roles in different environments. Forest Policy and Economics 31: 37–43.

Patton, M. Q. 2002. Qualitative Evaluation and Research Methods. Third edition. Sage Publications. California. 433p. & 230p.

Pollach, I. 2003. Communicating corporate ethics on the World Wide Web, a discourse analysis of selected company web sites. Sage Publications 2003. Business & Society 42(2): 277–287.

Porter, M. E. & Kramer, M. R. 2011. Creating shared value. Harvard Business Review.

Ranängen, H. & Zobel, T. 2014. Revisiting the 'how' of corporate social responsibility in extractive industries and forestry. Journal of Cleaner Production 84: 299–312.

Ratner, C. 2002. Subjectivity and objectivity in qualitative methodology. Forum: Qualitative Social Research 3 (3), Art. 16.

Ritchie, J. & Lewis, J. 2003. Qualitative Research Practice. A Guide for Social Science Students and Researchers. Sage Publications. London. 79p.

Roca, L. C. & Searcy, C. 2012. An analysis of indicators disclosed in corporate sustainability reports. Journal of Cleaner Production 20: 103-118.

Räty, T., Lindqvist, D., Nuutinen, T., Nyrud, A. Q., Perttula, S., Riala, M., Roos, A., Tellnes, L. G. F., Toppinen, A. & Wang, L. 2012. Communicating the environmental performance of wood products. Working Papers of the Finnish Forest Research Institute. Available at: http://www.metla.fi/julkaisut/workingpapers/2012/mwp230.pdf. [24/7/2014].

Räty, T., Toppinen, A., Roos, A., Nyrud, A. Q. & Riala M. 2014. Environmental policy in the Nordic wood product industry: Insights into firms' strategies and communication. Business Strategy and the Environment.

Schreier, M. 2012. Qualitative Content Analysis in Practice. Sage Publications. London. p. 3-16.

Sharma, S. & Henriques, I. 2005. Stakeholder influences on sustainability practices in the Canadian forest products industry. Strategic Management Journal 26: 159-180.

Silverman, D. 2000. Doing qualitative research: A practical handbook. Second edition. Sage Publication. London. 210p.

Stora Enso 2013. Stora Enso: Facts & Figures 2013. Available at: http://assets.storaenso.com/se/com/DownloadCenterDocuments/Stora_Enso_Facts_Figures_E_2013.pdf. [10/12/2014].

Strategic Program for the Forest Sector 2012. Metsäalan strateginen ohjelma 2011-2015. Väliraportti ja toimenpideohjelma. Työ- ja elinkeinoministeriön julkaisuja. Kilapilukyky 43/2012. Available at: https://www.tem.fi/files/34625/TEMjul_43_2012_web.pdf. [3/3/2015].

Strauss, A. L. & Corbin, J. 2008. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Third edition. Sage Publications. London. 52p. & 318p.

Strauss, A. L. 1987. Qualitative analysis for social scientists. Cambridge University Press. New York.

Tissari, J. 2009. Trade Development in Further Processed Wood Products. ITTO International Conference on Promotion of Intra-African Trade in Timber and Timber Products. Accra Ghana. Available at: http://www.fao.org/forestry/23572-0ec7499c7282796ed816b6aa4c0350251.pdf. [7/5/2014].

Toppinen, A., Toivonen, R., Valkeapää, A. & Rämö, A-K. 2013. Consumer perceptions of environmental and social sustainability of wood products in the Finnish market. Scandinavian Journal of Forest Research 28(8): 775–783.

Tuomi, J. & Sarajärvi, A. 2009. Laadullinen tutkimus ja sisällönanalyysi. Sixth edition. Tammi. Helsinki. 120p.

Unerman, J. 1999. Methodological issues. Reflections on quantification in corporate social reporting content analysis. Accounting Auditing & Accountability Journal 13(5) 667–680.

UN Global Compact 2014. United National Global Compact Strategy 2014-2016. Available at: http://www.unglobalcompact.org/docs/about_the_gc/UNGlobalCompactStrategy2014-2016.pdf. [14/5/2014].

UPM 2013. Annual Report 2013. More with Biofore. Available at: http://www.upm.com/EN/INVESTORS/Documents/UPM_Annual_Report_2013.pdf. [10/12/2014].

Vapo 2014. Vapo: Osavuosikatsaus 1.1. - 1.12.2013. Hallitus 14.02.2014. Available at: http://www.vapo.fi/filebank/1756-Osavuosikatsaus_1_1_-31_12_2013.pdf. [10/12/2014].

Versowood 2014. Versio /1.2014. Versowood-konsernin sidosryhmälehti. Available at: http://www.versowood.fi/wp-content/uploads/Versio_FI_1-2014.pdf. [10/12/2014].

Vidal, N. G. & Kozak, R. A. 2008a. Corporate responsibility practices in the forestry sector: Definitions and the role of context. The Journal of Corporate Citizenship 31: 59–75.

Vidal, N. G. & Kozak, R. A. 2008b. The recent evolution of corporate responsibility practices in the forestry sector. International Forestry Review 10(1): 1-13.

Wanderley, L. S. O., Lucian, R., Frache, F. & Sousa Filho de J. M. 2008. CSR information disclosure on the Web: A context-based approach analysing the influence of country of origin and industry sector. Journal of Business Ethics 82: 369–378.

Weber, R. P. 1990. Basic Content Analysis. Second edition. Series: Sage University Papers. Quantitative Applications in the Social Sciences vol. 49. Sage Publications. London. 17p.

Whittemore, R., Chase, S. K. & Mandle, C. L. 2001. Validity in qualitative research. Qualitative Health Reseach 11(4): 522.

Wood K Plus 2013. What Wood Believe: Societal perceptions of the forest-based sector and its products towards a sustainable society. Project Proposal. [19/6/2013].

Web pages

European Commission 2014. Enterprise and industry.
Corporate social responsibility (CSR), viewed 21/4/2014.
http://ec.europa.eu/enterprise/policies/sustainable-business/corporate-social-responsibility/index_en.htm

FAOSTAT Forestry 2014, viewed 19/12/2014.
http://faostat3.fao.org

FINLEX 2014, viewed 20/6/2014.
http://www.finlex.fi/fi/laki/ajantasa/2001/20010244#P15

Finnish Forest Industries Federation 2013a, viewed 6/5/2014.
http://beta.forestindustries.fi/toimialat/puutuoteteollisuus-ja-puurakentaminen/saha_ja_levyteollisuus/Sahateollisuus-kamppailee-korkeiden-kustannusten-kanssa-211.html

Finnish Forest Industries Federation 2014a, viewed 8/1/2015.
http://www.forestindustries.fi/in-focus/energy_climate/climate_trading/Unilateral-EU-decision-won-t-save-the-climate-1950.html

Forest Stewardship Council 2014, viewed 15/5/2014.
http://fi.fsc.org/periaatteet-ja-kriteerit.194.htm

Global Reporting Initiative 2014, viewed 20/6/2014.
https://www.globalreporting.org/information/about-gri/what-is-GRI/Pages/default.aspx

International Organization for Standardization 2009. ISO 3100:2009. Risk management — Principles and guidelines, viewed 25/2/2015.
https://www.iso.org/obp/ui/#iso:std:iso:31000:ed-1:v1:en

Kauppalehti 2014, viewed 10/12/2014-
http://www.kauppalehti.fi/5/i/yritykset/yrityshaku/

Linkedin 2015, viewed 23/2/2015.

https://help.linkedin.com/app/answers/detail/a_id/1561/~/company-pages---frequently-asked-questions

Karjalainen M. 2014, viewed 4/11/2014.
http://www.metla.fi/tiedotteet/2014/2014-11-04-puurakentaminen.htm

Metsä Group 2015, viewed 25/2/2015.
http://biotuotetehdas.fi/mika-hanke

Ministry of Economy and the Employment 2014, viewed 27/2/2015.
http://www.tem.fi/mso/puurakentaminen

Ministry of the Environment 2013, viewed 17/6/2014.
http://www.ym.fi/fi-FI/ymparisto/Kestava_kehitys/Mita_on_kestava_kehitys

Programme for the Endorsement of Forest Certification schemes 2014, viewed 15/5/2014.
http://www.pefc.fi/pages/en/about-pefc/pefc-system.php

Statistics Finland 2014, viewed 10/12/2014.
http://www.stat.fi/index_en.html

Stora Enso Biomaterials 2015, viewed 25/2/2015.
http://biomaterials.storaenso.com/

Trade Register 2014. Finnish Patent and Registration Office, viewed 19/12/2014.
http://www.prh.fi/en/kaupparekisteri/julkistamisvelvollisuus.html

United Nations 2014. Sustainable Development, viewed 10/6/2014.
http://sustainabledevelopment.un.org/index.html

UPM-Kymmene, viewed 25/2/2015.
http://www.upm.com/en/Pages/default.aspx

Westas 2014, viewed 10/12/2014.
http://www.westas.fi/index.php/yritys/taloustiedot

APPENDIX 1:

Corporate websites, which were collected and analyzed in this study

Company/ Association	Website address	Viewed
Finnish Forest Association	http://www.smy.fi/	10/5/2014
Finnish Forest Industries Federation	http://forestindustries.fi/	16/5/2014
Finnish Forest Industry Federation 2013. Responsibility at the heart of developing the bio-economy. Finnish forest industry commitments to environmental and responsibility issues	http://www.forestindustries.fi/mediabank/888.pdf	5/5/2014
Finnish Sawmill Association	http://www.suomensahat.fi/	9/5/2014
Forest Speaks- project	http://www.metsapuhuu.fi/	13/5/2014
Honka Log Houses	http://www.honka.fi/	14/5/2014
Isojoen saha	http://www.isojoensaha.fi/	17/5/2014
Junnikkala	http://www.junnikkala.com/index.php/fi/	17/5/2014
Keitele group	http://www.keitelegroup.fi/	10/7/2014
Koskisen	http://www.koskisen.fi/	15/5/2014
Kotkamills	http://www.kotkamills.com/	17/5/2014
Kuhmo	http://www.kuhmo.eu/	19/5/2014
Kuusamon Log Houses	http://www.kuusamohirsitalot.fi/	15/6/2014
Luvia wood	http://www.luviansaha.fi/	7/6/2014
Metsä Group	http://www.metsagroup.fi/Pages/Default.aspx	10/6/2014
Pölkky	http://www.polkky.fi/	1/7/2014
Siparila	http://www.siparila.fi/	18/6/2014
Stora Enso	http://www.storaenso.com/	15/6/2014
UPM-Kymmene	http://www.upm.com/	16/6/2014
Vapo	http://www.vapo.fi/	18/5/2014
Veljekset Vaara	http://veljeksetvaara.fi/	20/5/2014
Versowood	http://www.versowood.fi/	21/6/2014
Westas	http://www.westas.fi/	12/6/2014

APPENDIX 2:

Inductive output table of company and association -specific results

		Large companies			Family businesses												Associations					Bioenergy				
Themes	Categories	UPM	STORA ENSO	METSÄ GROUP	KOTKA-MILLS	KOSKISEN	HONKA	JUNNIKKALA	KEITELE GROUP	KUHMO	KUUSAMON LOG HOUSES	PÖLKKY	SIPARILA	VAPO	VELJEKSET VAARA	VERSO-WOOD	ISOJOEN-SAHA	LUVIA-WOOD	WESTAS GROUP	FINNISH FOREST ASSOCIATION	FOREST INDUSTRIES	FOREST SPEAKS - PROJECT	FINNISH SAWMILLS ACCOSIATION	Finnish forest industry: Responsibi	UPM	VAPO	VERSO-WOOD	ISOJOEN-SAHA	WESTAS GROUP	TOTALS:
ENV	Environmental impacts	119	53	31	4	3	4	4	6	3	1	6	0	7	0	0	0	4	1	2	3	38	2	1	5	119	7	0	4	2	429
	Environmental protection and biodiversity conservation	72	38	31	3	6	5	7	7	5	3	3	1	4	1	3	8	3	3	3	6	38	4	0	3	72	4	3	8	3	344
	Biobased products and bioeconomy	73	16	9	1	4	0	2	1	2	0	1	0	18	1	1	2	1	5	5	0	34	5	2	3	73	18	1	2	5	280
	Energy efficiency and management	41	14	16	1	0	2	1	3	1	0	1	0	5	0	0	1	1	1	1	1	9	0	1	4	41	5	0	1	1	151
	Material efficiency and reducing waste load	47	12	10	2	5	0	2	1	1	0	3	0	8	1	2	3	2	6	6	0	6	0	0	4	47	8	2	3	6	181
	Material sustainability	120	53	37	7	22	9	3	5	1	1	1	2	5	1	0	3	2	4	4	0	46	3	1	8	120	5	0	3	4	466
	Water efficiency and management	26	7	7	0	0	0	3	1	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	2	26	0	0	0	1	76
	Sum	498	193	141	18	40	20	22	24	13	5	15	3	47	4	6	21	10	22	10	12	173	14	5	29	498	47	6	21	22	1927
ECO	Competitiveness	34	15	13	0	4	0	0	1	0	0	2	0	3	0	3	0	0	0	3	1	32	0	0	0	34	3	3	0	0	148
	Financial operations and arrangements	108	56	65	2	6	22	3	5	1	2	4	0	47	2	5	4	2	3	3	1	32	0	3	1	108	47	5	4	3	541
	Risk management	20	23	9	0	0	2	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	20	10	0	0	0	94
	Sum	162	94	87	2	10	24	3	6	1	2	6	0	60	2	8	4	2	3	3	2	64	0	3	1	162	60	8	4	3	783
SOC	Employee development	25	16	15	2	8	0	2	1	1	0	0	1	6	0	0	1	0	0	1	0	5	0	0	0	25	6	0	1	0	116
	Employment	12	10	15	4	3	2	0	1	1	0	1	0	10	0	3	1	1	3	3	0	18	5	2	0	12	10	3	1	3	124
	Health, safety and well-being of employees	30	14	16	4	0	1	0	1	0	0	0	0	2	1	0	0	2	0	0	0	6	0	0	0	30	2	0	0	0	110
	Human and labor rights	12	24	5	1	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	2	0	0	0	12	1	0	0	0	60
	Law, legislations and regulations	45	57	25	2	2	1	1	1	2	1	0	0	30	1	0	4	2	0	1	0	33	0	0	0	45	30	0	4	0	287
	Stakeholder engagement	103	82	39	5	11	8	7	1	3	1	5	4	24	0	3	6	1	5	21	25	25	5	2	5	103	24	3	6	1	499
	Standards	71	37	24	9	7	6	7	4	4	3	1	5	6	2	5	4	5	1	0	6	6	0	1	0	71	6	5	4	3	299
	Sum	298	240	139	27	31	18	17	9	11	5	7	11	79	4	11	16	13	7	26	95	10	5	5	5	298	79	11	16	7	1495
	TOTALS:	958	527	367	47	81	62	42	39	25	12	28	14	186	10	25	41	25	32	38	332	24	13	35	958	186	25	41	32	4205	

APPENDIX 3:

Deductive output table of company and association -specific results

	Large companies			Family businesses												Associations				Bioproducers				
TOI	UPM	STORA ENSO	METSÄ GROUP	KOTKA-MILLS	KOSKISEN	HONKA	JUNNIK-KALA	KEITELE-GROUP	KUHMO	KUUSAMON LOG HOUSES	PÖLKKY	SIPARILA	VAPO	VELJEKSET VAARA	VERSO-WOOD	ISOJOEN-SAHA	LUVIA-WOOD	WESTAS GROUP	FINNISH FOREST ASSOCIATION	FOREST INDUSTRIES	FOREST SPEAKS - PROJECT	FINNISH SAWMILLS ACCOSIATION	forest industry: Responsibility at	UPM	VAPO	VERSO-WOOD	ISOJOEN-SAHA	WESTAS GROUP	TOTALS:
1. WBI																													
R&D	16	4	3	1	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	12	2	0	0	16	0	0	0	0	**59**
Innovation	52	21	15	0	2	8	0	0	0	0	0	0	1	1	0	3	0	0	0	15	2	0	2	52	1	3	0	0	**178**
Sum	**68**	25	18	1	3	**12**	0	0	0	0	0	0	1	1	0	3	0	0	0	**27**	4	0	2	**68**	1	3	0	0	**237**
2. FES																													
Type	45	18	8	0	0	2	5	2	2	0	0	0	2	1	1	1	4	1	1	4	22	12	0	2	45	2	1	4	1	**185**
Sum	**45**	18	8	0	0	2	5	2	2	0	0	0	2	1	1	1	**4**	1	1	**4**	**22**	12	0	2	**45**	2	1	4	1	**185**
3. CBP																													
Harvest	24	9	6	2	3	3	6	2	1	1	0	0	3	0	0	0	4	1	0	0	19	0	2	24	3	0	4	0	**117**
Responsibility	25	22	22	1	4	2	1	5	5	3	3	3	2	1	1	1	1	1	2	4	10	0	0	25	1	1	1	2	**148**
Sum	**49**	31	28	3	**7**	5	**7**	**7**	6	4	3	3	2	4	1	1	5	2	2	4	**29**	0	4	**49**	4	1	5	2	**265**
4. FGW																													
Forests	4	4	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1	3	2	0	1	4	0	0	0	0	**23**
Wood	138	68	46	7	27	7	0	5	1	1	1	1	2	8	1	0	2	1	4	0	53	3	1	10	138	8	0	2	4	**538**
Sum	**142**	72	46	7	**27**	9	1	6	1	1	1	1	2	8	1	0	2	1	4	1	**56**	5	1	11	**142**	8	0	2	4	**561**
5. FEC																													
Employment	54	38	23	6	5	2	2	2	1	0	0	0	1	13	1	0	1	2	0	1	14	0	0	0	54	13	0	1	0	**234**
Income	10	8	13	4	3	1	0	2	1	1	1	0	0	11	0	3	2	1	3	3	15	5	4	0	10	11	3	2	3	**120**
Energy	46	11	15	2	1	1	1	3	2	0	2	0	0	7	0	1	1	1	1	0	8	2	1	4	46	7	1	1	1	**166**
local environm	62	15	13	3	2	0	2	1	0	0	0	5	0	4	0	0	3	1	1	0	17	0	0	3	62	4	0	3	1	**202**
Social impacts	15	30	13	1	0	0	1	0	0	0	0	0	1	6	0	0	1	1	0	0	4	0	1	4	15	6	0	1	0	**101**
Sum	**187**	102	77	16	11	4	6	8	5	1	0	8	2	**41**	1	4	8	6	5	4	**58**	7	6	11	**187**	41	4	8	5	**823**
6. AVA																													
Label	61	23	21	7	7	5	7	1	6	1	1	5	6	3	5	4	4	4	3	0	3	0	1	0	61	6	5	4	3	**253**
Health	2	5	2	0	3	11	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	**31**
Emotion	3	6	6	0	13	9	0	0	0	1	3	3	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	**49**
Sum	**66**	34	29	7	23	**25**	7	2	6	3	5	5	8	6	3	5	4	6	3	0	**4**	2	1	0	**66**	6	5	4	3	**333**
7. BWW																													
Performance	12	20	18	1	14	18	1	1	0	3	7	0	0	0	0	0	0	0	0	0	2	0	0	0	12	0	0	0	0	**109**
Image	4	11	4	2	4	9	0	1	0	1	1	1	0	0	0	1	0	0	0	0	2	0	1	0	4	0	1	0	0	**47**
Substitute	3	12	5	0	0	6	0	1	0	2	0	0	0	0	0	1	1	0	1	0	0	0	0	0	3	0	1	1	1	**38**
Sum	19	**43**	27	3	18	**33**	1	3	0	6	8	8	1	0	0	2	1	0	1	0	**4**	0	1	0	**19**	0	2	1	1	**194**
8. EUW																													
Recycling	66	17	12	3	2	0	0	1	0	0	0	0	1	1	0	0	0	1	1	0	25	2	1	7	66	1	0	0	1	**208**
Residues	16	6	6	2	5	0	2	2	2	2	0	2	0	4	1	2	2	2	6	0	4	0	0	1	16	4	2	2	6	**95**
Sum	**82**	23	18	5	**7**	0	2	3	2	0	2	1	5	1	2	2	3	**7**	0	**29**	2	2	1	8	**82**	5	2	2	7	**303**
TOTALS:	**613**	**348**	**243**	**42**	**96**	**90**	**24**	**31**	**20**	**15**	**27**	**17**	**65**	**8**	**17**	**26**	**18**	**23**	**9**	**229**	**20**	**10**	**36**	**658**	**65**	**18**	**22**	**23**	**2716**